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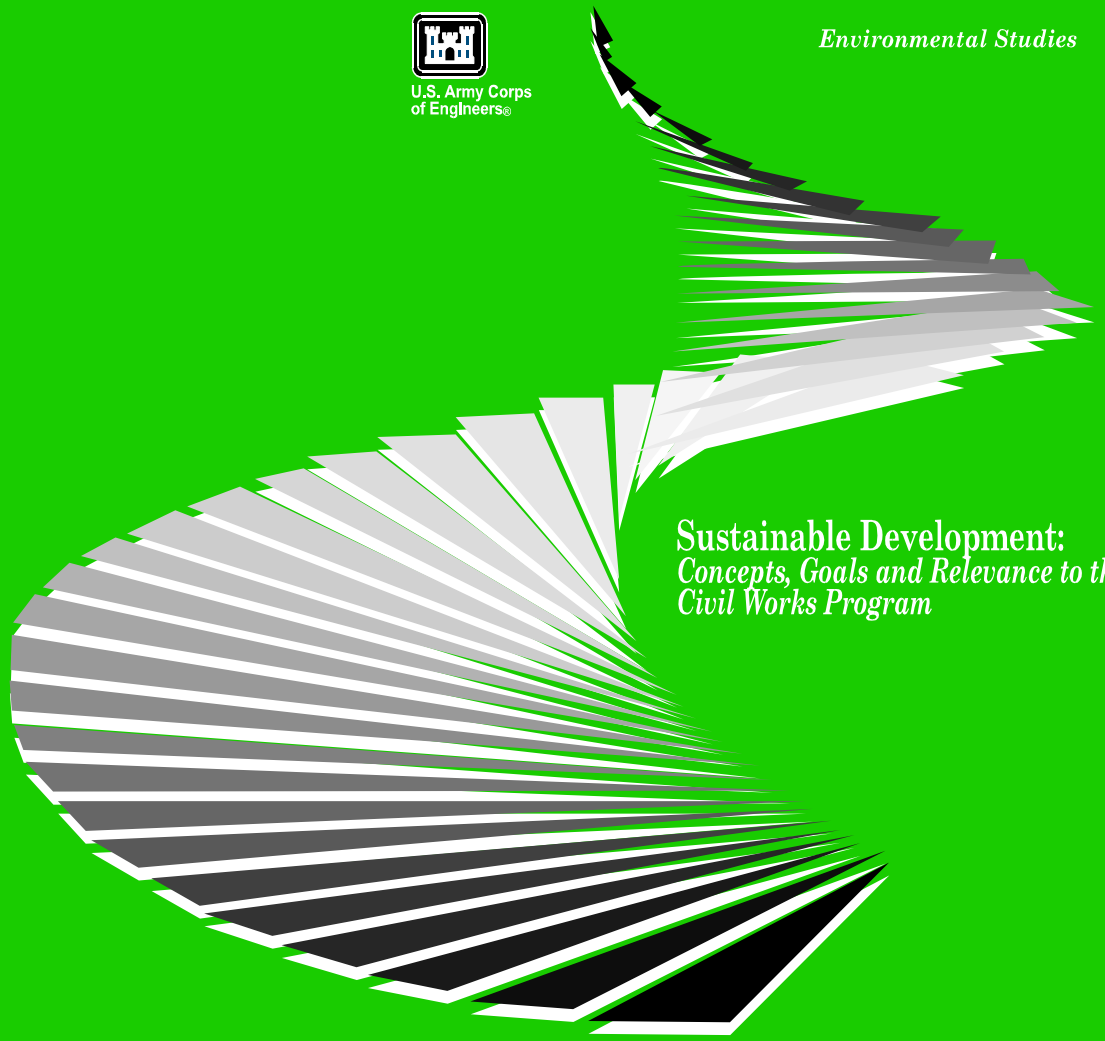

Sustainable Development:
Concepts, Goals and Relevance to the Civil Works Program

U.S. Army Institute for Water Resources
Policy and Special Studies Programs

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Table of Contents

Acknowledgments ..... **iii**

Executive Summary ..... **vii**

Chapter I. Introduction **1**
- **Purpose.** **2**
- **Report Organization.** **2**

Chapter II. Background **3**
- **Brundtland Commission** **3**
- **New Delhi Conference** **3**
- **Dublin Conference** **4**
- **Earth Summit** **5**
- **World Bank** **5**
- **UNESCO/ASCE Sustainabilty Criteria for Water Resources Systems** **5**
- **Academic Literature** **7**
- **Water Resources Literature** **9**
- **Water Resources Planning Act of 1965** **9**
- **Federal Water Resources Planning Procedures** **10**
- **Galloway Report** **11**
- **The National Environmental Policy Act.** **11**

Chapter III. President's Council on Sustainable Development **15**
- **National Goals for Sustainable Development** **17**
- **PCSD Policy Recommendations** **17**
- **Sustainable Development Indicators** **21**
- **PCSD Task Forces and Reports** **23**

Chapter IV. Sustainable Development Elements and Themes **25**
- **Elements of Sustainable Development** **25**
  - **Economic Sustainability** **25**
  - **Environmental Sustainability** **27**
  - **Social Sustainability and Equity** **29**
- **Themes of Sustainable Development and Criteria for Developing Policy Tools** ... **32**

Chapter V. Sustainable Development and the Civil Works Program **33**
- **General Assessment of the Current Civil Works Program** **33**
- **Watershed Planning and Management** **34**
- **The Corps' Regulatory Program** **36**
- **Using Strategic Frameworks to Guide Regulatory Decisions** **37**

Frameworks for Federal Water Resources Planning 38
PCSD Recommendations Relevant to the Civil Works Program 40
Conceptual Alternatives for Integrating Sustainable Development into the Civil Works Program 44

Chapter VI. Findings and Conclusions 47
Findings 47
Conclusions 49

References 51

Appendix A - PCSD Policy Recommenations & Goals 57
Appendix B - PCSD Policy Recommendations Relevant to Civil Works Program 59
Appendix C - Equity Considerations in Sustainable Development 79

List of Text Boxes:

Box 1. **Brundtland Commission - on Achieving Sustainable Development**
Box 2. **New Delhi Statement Guiding Principles**
Box 3. **P&G Accounts**
Box 4. **Sustainable Development Reiterates NEPA Policy**
Box 5. **National Goals for Achieving Sustainable Development**
Box 6. **PCSD Publications**
Box 7. **Social Well-Being Considerations**
Box 8. **Recurring Themes of Sustainable Development**
Box 9. **Civil Works Involvement in and Response to Sustainable Development Represented along Several Continua**
Box 10. **Concerns from Dublin Principles Relevant to Water Resources Development within the Civil Works Program**
Box 11. **Principles from the Civil Works Watershed Perspective**

List of Tables:

Table 1. ***PCSD* Policy Recommendations (With Those Applicable to the Civil Works Program)**
Table 2. **Economic, Environmental, and Social View of Indicators**
Table 3. **Long-term Endowments & Liabilities, Processes, & Current Results View of Indicators**

List of Figures:

Figure 1. **NED-EQ Tradeoffs**

Executive Summary

This report discusses alternative ways in which the Corps could treat the concepts of sustainable development within the Civil Works program. The President's Council on Sustainable Development (PCSD) released its report, **Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future**, in February 1996. It addresses the challenges of creating sustainable development, in the United States and in the global community. Sustainable development is defined as that which *meets the needs of the present without compromising the ability of future generations to meet their own needs.* The Council's report highlights a triad of goals, **economic prosperity, environmental health and social well-being and equity**, and notes that these issues cannot be addressed successfully in isolation from each other. The Council emphasizes that we must pursue public policies which integrate these goals, and apply more systematic consideration of the consequences of current actions on future generations.

The Council's report identifies a number of specific goals, recommendations, and public policy reforms which could advance sustainable development (only about 25% of the recommended actions apply to the federal government). To date, the Administration has not charged the Corps and other federal agencies with implementing the PCSD recommendations. This policy study was undertaken to provide familiarity with the concept of sustainable development and the Administration initiative. It provides a starting point for thinking about the concepts associated with sustainable development and the relevancy of PCSD recommendations to the Civil Works program.

This report starts with a brief background on sustainable development as a concept, then summarizes the goals and recommendations identified in the PCSD report. The PCSD recommendations relevant to the Civil Works program and activities are examined. Examples of ways in which various Civil Works programs and activities contribute to sustainable development are presented. Some of the discussion areas include watershed planning and management, the Corp's Regulatory program, use of strategic frameworks to guide regulatory decisions, and federal water resources planning frameworks. Alternative ways in which the Corps could consider or incorporate the concepts of sustainable development in the Civil Works program are discussed in terms of low, moderate and high levels of emphasis in factors such as management philosophy, authorities and mission areas, business practices and the application and development of tools and technologies. These examples were developed in an attempt to generate thinking and discussion about sustainable development in relation to the Civil Works program and are not intended to be comprehensive. Many of the examples are not mutually exclusive. They range from: taking no initiative; to incorporating sustainablity as a "value" and addressing the concept implicitly; to identifying actions the Corps could take within existing authorities which advance the goals of sustainable development; to pursuit of additional new authority and expansion of the time horizons and cumulative effects considered as part of Civil Works problem solving and project operations and management.

FINDINGS

- The primary tenet of the PCSD report is that social, economic and environmental problems are intertwined and must be considered together, and that institutions and individuals must adopt a new way of thinking that inextricably links these issue areas.

- The PCSD report emphasizes a need to shift from single-minded advocacy to action that ensures progress in all three areas of economics, environmental health and social equity.

- Many authors note that sustainable development cannot be reached directly, but only approximately and indirectly, through a sustained period of confronting and resolving the conflicts between the various goal areas.

- The PCSD report outlines 38 major policy recommendations and over 1,500 ways to achieve them; only about 25% of the recommended actions apply to the federal government, with the remaining 75% to be implemented by other levels of government, business, communities and individual citizens.

- There are strong parallels between the four accounts of the P&G and P&S[1] (NED, EQ, RED, SWB/OSE), and the three elements of sustainable development (economic efficiency and prosperity, environmental protection, and social well-being and equity). This connection suggests that the P&G framework provides a useful foundation for an analytic basis for addressing issues of sustainability as part of Civil Works water resources planning and development.

- Even though sustainable development has not been an explicit criterion in Corps decision making, the planning process and the basic Civil Works evaluation framework contain many of the elements of a structured approach which can support the goals of sustainable development. The Corps has focused primarily on economic development until recently when objectives related to ecosystem restoration were elevated as a programmatic priority. Nonetheless, environmental and social concerns are not ignored in Civil Works project development. Consideration of local and other objectives, along with competing resource considerations are incorporated by virtue of: the authorization and appropriation processes through which Corps projects must pass; a public involvement processes integral to the study process; sound engineering judgment; and, environmental impact assessment.

- In spite of the strengths of the P&G and NEPA frameworks, other factors challenge the Civil Works program to conduct business in a manner that fosters sustainable development. The emphasis on "projects" rather than "problem solving which takes into account the contexts for and trade-off implications of alternatives" may result in investments that do not support sustainable development goals. However, the goal interdependencies and implications may well be addressed through the political process at the Administration or Congressional levels during authorization.

- The Corps' general policies for evaluating permit applications are intended to provide a balanced evaluation of all of the potential benefits and anticipated adverse impacts **across a wide range of evaluation factors**. The provisions for this "public interest review" compliment the sustainable development philosophy of considering the economic, environmental, and social effects of proposed actions. Some of these reviews are done at the programmatic level when nationwide or general permits are developed, rather than for individual actions.

- There is growing recognition of the integral relationship between the Nation's economic prosperity and a healthy, natural resources base. The increased rates of habitat destruction, fragmentation, and

[1] P&G and P&S refer to the U.S. Water Resources Council *Principle and Guidelines for Water and Related Land Resources Planning,* and the *Princples and Standards for Water and Related Land Resources Planning*. NED: national economic benefits; RED: regional economic benefits; EQ: environmental quality; SWB: social well-being; OSE: other social effects.

land use conversions have led to substantial losses of biodiversity and extinction of species, which in turn have led to losses of ecosystem structure and functions important to society.

- Ecosystem management, managing nature to achieve a particular state or condition, is different from managing nature to produce goods and services. However, as humans are part of the ecosystem, these goals (i.e. managing to achieve a particular condition and to produce goods and services) need not be mutually exclusive. Sustainable development concepts suggest striving to achieve a state or condition which provides for goods and services while acknowledging the limitations to both the ecological resources and the goods and services provided.

- The environmental aspects of sustainable development are broader than the environmental quality account as the Corps currently views it. The Corps will be challenged to incorporate more comprehensive environmental concepts, such as biodiversity and ecosystem integrity and resilience into the planning and analysis process, as well as in the operation of its projects.

- The renewed Federal emphasis on watershed planning and management provides opportunities to integrate environmental, economic and social objectives to water and related resources problem solving. Such approaches, when combined with interagency and intergovernmental collaboration can foster the goals of sustainable development.

- Many of the principles needed to foster sustainable development may be most appropriately incorporated into the higher, strategic levels of planning and management embodied in such evolving frameworks as ecosystem management, watershed management, river basin planning, regional land use management or coastal zone management. Within the Civil Works program, the application of the "watershed perspective" (per PGL 61[2]), multi-objective planning, the public interest review applied in the Regulatory program, and master planning for operating projects which integrates natural resources management into the project operations management all provide opportunities to support the PCSD recommendations.

- The P&G is one of a handful of organized planning frameworks which integrates the principles of economic benefit-cost theory, social choice theory and decision theory into a cohesive set of principles and practical procedures. It provides a framework which can be useful in analyzing projects for their respective contribution to the goals of sustainable development. However, there is a sense that while the planning framework of the P&G affords this type of analysis, current implementation involves a reduced rigor of analysis in accounts other than NED for most Civil Works projects. Similarly, the formulation of ecosystem restoration projects may not always include analysis of the implications of a recommended alternative on economic and social considerations.

- The system of accounts provided by the P&G can be useful in identifying competing demands and key tradeoffs, and in helping to operationalize the principles of sustainable development. An inclusive set of information on effects and tradeoffs can help provide a better understanding of both the intended and unintended consequences of decisions. While difficulties in evaluating and choosing tradeoffs persist, the increased availability of the information can help reduce uninformed decision making.

[2] Policy Guidance Letter No.61, "Watershed Perspective for the Civil Works Program".

- Increased pressures to reduce study schedules and costs may challenge abilities to pursue collaborative approaches, assure meaningful public and stakeholder involvement, and examine the alternative implications of proposed projects on factors that influence sustainable development goals.

CONCLUSIONS

- **The PCSD objectives and action plan affect all levels of society.** The PCSD lays out a series of objectives and actions that would foster sustainable in the various activities, endeavors and programs of all levels of government, the private sector and communities. Sustainable development is an important umbrella concept for integrating various components of society's overarching goals, such as economic prosperity, environmental quality and social well-being and equity. Only certain objectives can be achieved through specific programs and projects at any one time. Many of the PCSD objectives, which individually are inherently positive, may conflict with one another in application. The PCSD does not specifically discuss or acknowledge that tradeoffs will be needed.

- **Contemporary water resources management principles (if not practices) are compatible with sustainable development.** The water resources management field has had to deal with the underlying issues and respective notions of sustainable development and its implementation in a practical sense. Many of the ideas and terminology associated with sustainable development are derived from water resources literature and policy pronouncements. The Corps, along with other federal agencies ought to be actively involved in the process to better define and support the goals of sustainable development.

- **The principles of sustainable development will increasingly become part of Federal decision making.** Even if the Corps or other agencies should pursue a less aggressive role in sustainable development, the evolution of, and pressure for incorporating sustainable thinking as part of project evaluation is likely to increase. It is not a matter of whether mankind will engineer its environment, but how it will do so -- and thus, what principles will guide future decisions.

- **Sustainable development is compatible with strategic planning.** Many existing agency evaluation frameworks that are used to guide decision making for specific actions or projects, have specific rules and decision criteria which are often derived from law, scientific technical criteria, and court decisions. These prescriptive requirements make it more difficult to adapt site- or project-specific regulatory guidelines to the more general principles of sustainable development. Instead, it may be most appropriate to incorporate many of the higher-order principles needed to foster sustainable development into strategies and plans at the higher, strategic levels of planning and management, embodied in such evolving frameworks as ecosystem management, watershed management, river basin planning, regional land use management, or coastal zone management. Regulatory decisions then, could be made against a background of resource management tradeoffs that have already been negotiated to a large extent through the higher order public planning processes which have identified compatible ensembles of actions, management measures, individual projects and regulatory constraints.

- **Achieving sustainable development is a collaborative effort.** The Corps should continue to develop practical and coherent policies and guidelines that complement the core principles of sustainable development as expressed in the PCSD, however a single agency cannot independently develop operational guidelines for broad, sweeping sustainable development principles. While the Corps can unilaterally move ahead to promote sustainable development within its own programs,

most of its decisions and actions will be influenced by the actions of other agencies. Hence, other federal regulatory, and planning and resource management agencies should be involved in an interagency effort to explicate the concepts so that they can be more uniformly applied at all levels of decision making.

- **The P&G are a useful starting point for sustainable development.** The current P&G, with its single national economic development objective, may not effectively advance all components of sustainability. However, a broader application of the planning process is possible, and has been applied the past under the Water Resources Council's Principles and Standards (1973-1980). The planning guidelines and the system of accounts can provide a practical, tangible and implementable framework for grasping and organizing the multiple objectives that underpin the PCSD goals. An important starting point for the development of an integrated framework within the Corps could be the synthesis of the P&G and NEPA evaluation frameworks.

- **Current practices designed to streamline project delivery may impede sustainable development**. A number of factors may potentially impede Civil Works support of sustainable development. Among the most significant of these factors are: the increasing tendency to disregard alternatives development and analysis and to short circuit stakeholder involvement and trade off analysis in the interest of tightening project schedules and costs; and the increased role of sponsors who may not be interested in the considering alternatives developed through a comprehensive approach to water resources problem solving and examination of the implications of various alternatives. As Civil Works program execution and other strategies are developed, it would seem essential that consideration be given to the implications of various program and project management approaches and recommendations on National sustainable development goals.

- **The PCSD report does not address the tradeoffs needed to achieve sustainable development.** Neither the PCSD report nor other sources of information tell us how to balance the three elements of sustainability, or how to actually achieve sustainable development. Sustainable development emphasizes incorporating consideration of interdependencies and long term consequences of actions into decision making, and reinforces the need to improve abilities to examine tradeoffs and to use this information in decision making. Currently, measurement of progress toward sustainable development is descriptive and directional. In reality, sustainable development may not be reached directly, but only approximately and indirectly, through a prolonged period of confronting, and trying to understand and resolve the conflicts among the three goal areas.

Sustainable Development
Concepts, Goals and Relevance to the Civil Works Program

Chapter I. Introduction

Water resources are among the central elements of many sustainable development objectives and discussions. Agenda 21 pointed out that the "extent to which water resources development contributes to economic productivity and social well-being is often not appreciated, although all social and economic activities rely heavily on the supply and quality of freshwater" (UNCED Agenda 21, 1992, in United Nations Development Programme, 1994, pg. 71). The Corps' "business" includes water resources development and management. As a major natural resources management agency which allocates and distributes a significant share of national infrastructure investments, the Corps has a significant supporting role in influencing the attainment of sustainable development.

The President's Council on Sustainable Development (PCSD) published its report in February 1996. The report identifies three overarching areas in which to strive for balance as part of promulgating the principles of sustainable development. These areas are: *economic efficiency, environmental health, and social well-being and equity*. The Council's report asserts that these considerations are interdependent and must be pursued simultaneously and in a balanced way if sustainable development goals are to be achieved. These considerations are often referred to as "elements" of sustainable development. Depending upon the context in the discussion, different emphasis is placed on each of these terms. This is not surprising as the issues and considerations associated with each element are complex and far reaching. Each of these elements is discussed in Chapter IV of this report.

The Corps has considerable responsibility, experience and expertise in many aspects of water and associated natural resource (wetlands and aquatic ecosystems, coastal areas) development and management. Integral to a number of its programs and activities are processes which accommodate or can foster many of elements and goals of sustainable development. Two examples are found in the water resources planning and the regulatory decision making functions of the Corps. The planning and evaluation process that the Corps uses in water resources development requires involvement by stakeholders, quantitative analysis of problems and opportunities, as well as identification and evaluation of alternative solutions. Regulatory decisions include a public interest review so that impacts on various decision factors and social needs and objectives can be considered. Updates of reservoir system operating plans take into account purposes as specified in the original project authorization as well as changing demands on water control systems. These process can accommodate tradeoffs among multiple competing objectives and demands, and they can be applied to address the interrelated elements of sustainable development.

Sustainable development requires an integrated, holistic melding of sound management principles that ought to guide each agency. However, no single agency can independently implement the principles of Sustainable development without an active collaboration among all the agencies that are involved in decision making. Even if the Corps does not formally take a position on or acknowledge a role in advancing the goals of sustainable development, it will continue to significantly affect water resources through its Civil Works mission, and the development and management of water and related resources. It must be acknowledged that it is not *whether* the Corps or others will engineer and manage the environment, but *how* we will do so -- and

thus, what principles shall guide future decisions. In carrying out its Civil works mission, the Corps will influence all three elements of sustainable development in some fashion or other. Through its project planning, implementation and management and the regulatory program, the Corps currently affects issues of social well-being, equity, economic efficiency and environmental quality. Many decision criteria that are used by the Corps, along with its overall evaluation process take into account many, but not all of the goals of the PCSD. Recognizing this, the Corps and other agencies can work to develop strategies and processes that provide integrated consideration of the three areas as part of water quantity and quality development and management. The notion of equity, however, as presented in the PCSD report, appears to move in directions that go beyond the principles that are currently practiced by the Corps and most other federal agencies. However, most of the fundamental principles of equity encompassed within the PCSD report are routinely practiced by the Corps, as exemplified by its wide public participation program.

Purpose. The purposes of this study are to summarize and discuss the concepts, goals and recommendations identified in the PCSD report that are most relevant to the Civil Works program of the U.S. Army Corps of Engineers. To date, the Administration has not directly charged the Corps and other federal agencies to implement the recommendations contained in the PCSD report. This report was prepared to provide familiarity with the Administration initiative, in anticipation of such a tasking, and to provide a starting point for thinking about the relevancy of the PCSD recommendations to the Civil Works program. It also provides discussion on how the Corps can contribute to the sustainable development goals, and ideas on alternative ways in which the concept of sustainable development can be incorporated into the Civil Works program. The Executive Dirctor of the PCSD stated that *the Council's greatest hope was to produce a report that would lauch a dialogue about how to best achieve sustainability. This policy study report is an initial inquiry within the Corps Civil Works program, and is intended to be part of the dialogue described by the PCSD*.

Report Organization. The remainder of this report is organized in the following manner. Chapter II provides background on the concept of sustainable development, drawing from the relevant literature and reports from key conferences on resolving long-term environmental, health, social and economic issues. Chapter III describes the activities of the PCSD and summarizes the goals and policy recommendations contained in the 1996 PCSD report. Chapter IV discusses the three overarching areas that the PCSD emphasizes as key to sustainable development (economic, environmental, and social sustainability and equity), and discusses themes related to implementation of the sustainable development goals within the Civil Works program. Chapter V presents: a general assessment of the Civil Works program to provoke thinking about the current and potential emphasis on the various components of sustainable development within Civil Works programs and activities; discussion on several topics to illustrate incorporation of the principles of sustainable development into the Civil Works program (including watershed planning and management, the Corps' Regulatory program, using strategic frameworks to guide regulatory decisions, and frameworks for federal water resources planning); a summary relating the PCSD policy recommendations to Civil Works programs and activities; and a range of conceptual alternatives for integrating sustainable development into the Civil Works program. Chapter VI presents findings and conclusions.

The Council's report contains numerous policy recommendations and suggestions regarding their implementation. Appendix A illustrates the interconnectedness of the PCSD policy recommendations and the PCSD goals of sustainable development. Appendix B discusses the PCSD policy recommendations and suggested actions most relevant to the Civil Works program of the Corps and provides examples of how these recommendations and action points are, or might be relevant to the Civil Works program.

Chapter II. Background

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland Commission)

The history of sustainable development as a concept is marked by diverse academic writings and a number of key fora in which interests from multiple countries gathered to discuss, define and outline means for resolving long term environmental, health, social and related economic issues. A number of these meetings addressed water issues in particular and looked at them from different vantage points: water supply; public health and sanitation; irrigated agriculture; water and the environment; water management and sanitation utilities; comprehensive water resource management; and water sector capacity building. These resource issues are related to sustainable development because they emphasize that the relationships among a healthy environment, healthy economies and healthy societies are intertwined. Among the key fora that predate the PCSD are: the Brundtland Commission (World Commission on Environment and Development, 1987); the New Delhi Conference, in 1990; the Dublin Conference on Water and the Environment in 1992; and, the Earth Summit in Rio de Janeiro in 1992. The PCSD drew from this body of knowledge. The key aspects of these meetings, as related to this paper, are briefly described in the following paragraphs.

Brundtland Commission. The World Commission on Environment and Development (Brundtland Commission) first met in October 1984. The group was a special, independent commission convened by the United Nations to formulate a global agenda for change. The commission's definition of the term "sustainable development" has probably become the most widely used, and it is the one adopted by the PCSD: *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* Elaboration on this definition is provide in Box 1. The commission's report, issued in April 1987, discussed a number of policy directions and institutional reforms. In particular, it called for decisive political action to achieve sustainable human progress and human survival. The Brundtland Commission focused on defining the concept of sustainable development and emphasized the development of strategies consistent with the overall goals.

Box 1. Brundtland Commission - on Achieving Sustainable Development

Sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs. We do not pretend that the process is easy or straight forward. Painful choices have to be made. Thus, in the final analysis, sustainable development must rest on political will. (World Commission on Environment and Development, 1987).

New Delhi Conference. The Global Consultation on Safe Water and Sanitation for the 1990s was organized by the United Nations and held in New Delhi in September of 1990. One product of the conference, the New Delhi Statement, is an appeal to all nations for concerted action "to enable people to obtain two of the most basic human needs -- safe drinking water and environmental sanitation." The New Delhi Global Consultation recommended four principles, as summarized in Box 2. The New Delhi Conference focused on strategies which dealt with how to achieve sustainable development in a coherent manner.

Box 2. New Delhi Statement Guiding Principles (United Nations Development Programme, 1994, pg. 23.)

- Protection of the environment and safeguarding health through the integrated management of water resources and liquid and solid wastes.
- Institutional reforms promoting an integrated approach and including changes in procedures, attitudes and behavior, and the full participation of women at all levels in sector institutions.
- Community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programs.
- Sound financial practices, achieved through better management of existing assets and widespread use of appropriate technologies.

Dublin Conference. The International Conference on Water and the Environment: Development Issues for the 21st Century, was held in Dublin in January of 1992. Recognizing the emerging global water resources situation as critical, conference participants adopted the Dublin Statement on Water and Sustainable Development. The statement says that: "The problems highlighted are not speculative in nature; nor are they likely to affect our planet only in the distant future. They are here and they affect humanity now. The future survival of many millions of people demands immediate and effective action."

The Dublin Statement also declares that: *Scarcity and misuse of fresh water pose a serious and growing threat to sustainable development and protection of the environment. Human health and welfare, food security, industrial development and the ecosystems on which they depend, are all at risk, unless water and land resources are managed more effectively in the present decade and beyond than they have been in the past.*

Conference participants called for new approaches to the assessment, development and management of freshwater resources to be brought about through political commitment and involvement from the highest levels of government to the smallest communities. The guiding principles recommend a **participatory approach**, stating that water development and management should involve users, planners and policy makers at all levels. The Dublin principles also state that water should be recognized as an **economic good** and "*the failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use and encouraging conservation and protection of water resources*." The Dublin Statement included a number of items that relate to water management and potentially to Civil Works mission areas: protection against natural disasters, including floods and droughts; protection of aquatic systems (quantity and quality issues); water conservation and reuse; urban water supply; resolving water conflicts. Among the requirements outlined in the Dublin Statement are investments to back the commitments, public awareness campaigns, legislative and institutional changes, technology development, and capacity building programs (United Nations Development Programme, 1994.) The Dublin Statement reiterated that sound (sustainable) water resources management must be conducted in a participatory manner and water itself must be viewed in economic terms.

Earth Summit. The United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit, was held in Rio de Janeiro, Brazil in June of 1992. More than 100 heads of state and representatives of 178 nations attended, making it the largest diplomatic gathering in modern history. The goals of the summit were to determine what actions and policies were needed to ensure the preservation of the environment, while allowing for appropriate economic growth.

Among the products of the Summit was *Agenda* 21, a broad, 40 chapter, nearly 500 page plan for sustainable development now and into the 21st century. In addition, a statement concerning the principles of sustainable development was compiled in "The Rio Declaration on Environment and Development." As part a result of the Summit, the President's Council on Sustainable Development (PCSD) was formed by President Clinton in June 1993 to promote sustainable development and *Agenda 21*. The Summit also produced treaties on climate change (which set a goal of reducing emissions of carbon dioxide and other greenhouse gases to 1990 levels by the year 2000) and biological diversity that were signed by more than 150 countries.

World Bank. Water resources management is one field that, perhaps more than most other sectors, has had to deal with the underlying issues and respective notions of sustainable development and its implementation in a practical sense. Institutions such as the World Bank, and several of the United Nations organizations such as the UN Development Program (UNDP) and the UN Environment Program (UNEP) as well as the UN Food and Agriculture Organization (FAO), all have had a substantive role in formulating and promoting the various principles and statements that have come to define the term "sustainable development". Thus it comes as no surprise to learn that many of the ideas and terminology associated with sustainable development are derived from water resources literature and policy pronouncements. Perhaps the most useful element of the term "sustainable development is that it implicitly encompasses many complementary ideas and serves to represent a coherent strategy of principles and actions that may be different for each sector (water resources, agriculture, energy, etc.).

The World Bank (1993) has developed, as part of its water management strategy, a set of ideas and principles that address the aims of sustainable development, and places them in an operational context. The Bank's overarching objective is "..to reduce poverty by supporting the efforts of countries to promote equitable, efficient, and sustainable development." Through its economic and sector work, the Bank "…will promote policy reforms, institutional adaptation and capacity building, environmental protection and restoration and cooperation in the management of international watercourses." There are many more components of this water policy, including the development of a comprehensive analytical framework that is designed to evaluate options for conformance to national water management strategies that incorporate interdependencies between water and land use. The Bank will also assist governments in establishing a strong legal and regulatory framework for dealing with pricing, water allocation and environmental protection. There are many other components to the World bank's strategy that center around technology transfer, economic incentives, decentralization and privatization of services and the promotion of public participation. The essential point is that the World Bank’s water management strategy is a specific enumeration of how to implement the basic ideas encompassed within the PCSD, and as such, provides a useful blueprint for the U. S. federal and state water management agencies.

UNESCO/ASCE Sustainabilty Criteria for Water Resources Systems. A joint effort, organized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the American Society of Civil Engineers (ASCE), examines many of the major issues raised by the concept of sustainability applied to water resources system design and management (ASCE, 1998). As such, the UNESCO/ASCE inquiry

comes closest to dealing with the types of issues that the Corps of Engineers has to contend with in trying to develop ideas for practical and operational guidelines. The UNESCO/ASCE group first modified the Bruntland Commission definition of sustainable development as follows:

> "*Sustainable water resource systems are those designed and managed to fully contribute to the objectives of society, now and in the future, while maintaining their ecological, environmental, and hydrological integrity."*

According to their report, the concept of sustainability defies precision, and is viewed as a moving target, defining states and stages of attainment that are relative to the objectives of society. Key concepts and aspects of sustainable development are tradeoffs and accounting for change and the future. The future is highly uncertain, but there are some ways for compensating for that uncertainty by building in robustness and resiliency into designed systems. But a large part of sustainability is simply being open to change through adaptation and tradeoffs.

> "*In the face of certain changes, but with uncertain impacts, an evolving and adaptive strategy for water resources development management and use is a necessary condition of sustainable development."*

The report states that we can only guess the future objectives and desires of future generations, but we need to establish them to the best of our professional abilities and take them into account as we act to satisfy our own needs in the foreseeable future.

> *"A sustainable economy can only be realized if there is a continued adaptation, creation, and innovation, the implementation of new knowledge, new attitudes and technologies, and new operating policies…*"

The UNESCO/ASCE report presented various guidelines and criteria for incorporating sustainability considerations into contemporary planning and design. Many of them are included in the conventional practices of the Corps, including risk analysis, benefit-cost analysis, environmental impact analysis, etc. However, the report developed a set of higher order guidelines, as well, for the planning and management of sustainable water resources systems which represent a blueprint for progressive adaptive management:

- Developing a shared vision of desired social, economic and environmental goals benefitting present as well as future generations and identifying ways in which all parties can contribute to achieving the shared vision

- Developing coordinated approaches among all concerned and interested agencies to accomplish these goals, collaborating with all stakeholders in recognition of mutual concerns.
- Using approaches that restore or maintain economic vitality, environmental quality and natural ecosystem biodiversity and health.

- Supporting actions that incorporate sustained economic, socio-cultural and community goals.

- Respecting and ensuring private property rights while meeting community goals and working cooperatively with private stakeholders to accomplish these common and shared goals.

➢ Recognizing that economies, ecosystems and institutions are complex, dynamic and typically heterogeneous over space and time and developing management approaches that take into account and adapt to these characteristics.

➢ Integrating the best science available into the decision-making process, while continuing scientific research to improve knowledge and understanding.

➢ Establishing baseline conditions for system functioning and sustainability against which change can be measured.

➢ Monitoring and evaluating actions to determine if goals and objectives are being achieved.

Academic Literature. The ideas which give rise to the concept of sustainable development are not new. Discussion of and literature on environmental and social issues related to sustainable development grew dramatically following the 1990s and 1990s. Boulding (1966) wrote that man was in a transition from viewing the world as an open system to viewing it as a closed system. Martial (1973) recognized many of the issues of sustainable development. Pezzey (1989) traced the evolution of the sustainable development concept through the "limits of growth" debate of the 1970s. Gore (1992) traced the philosophy, linking man and nature and leading toward sustainable development, from Aristotle and Thomas Aquinas. Smith (1993) reviewed the historical perspective of economists in the 18th through early 20th centuries who questioned the foundations of economic thought and expressed ideas which presaged the sustainable development concept.

In the 1990s, the discussions of "carrying capacity"[3] were expanded to include the notion that a particular number of people or amount of an activity (e.g. industry) can be supported (sustained) by resources available in an area. In addition, the efforts to conduct "cumulative effects" analysis, as part of the analysis of environmental impacts, demonstrated consideration of objectives and benefits beyond immediate location of an activity and over some long-term period of time.

"Sustainable development" has been discussed extensively since the Brundtland Commission report made the concept central to thinking on environment and development. Pezzey (1989) included a list of 27 definitions which had been published up to 1989. Lele (1991) wrote that analytical exactness was needed to make sustainable development useful, but Barbier (1987) suggested ignoring the definition problem and moving to implementation. Costanza and Patten (1995) wrote that sustainable development is a problem of prediction, not definition. They suggest that a sustainable system is one that survives or persists and thus can only be determined after the fact.

Tisdell (1988), looking at sustainable development as an economist, thought the concept unclear because the tradeoffs, particularly the intergenerational ones, were not properly debated or considered based on opportunity costs. Daly (1990), however, points out that sustainable growth is impossible, as the economy is limited because the economy is an open subset of the limited environment. Ekins (1993) synthesizes the

[3] Carrying capacity originated as an ecological term that specifies the number of healthy individuals that the resources of a habitat can support. It describes the capacity or ability of a natural system to support a given number/type of species, in some type of equilibrium, without stressing the available resources. It should be noted that human carrying capacity may be enhanced through technology (e.g. solar energy, wind, and tidal power) and help to leverage man's ability to flourish, even in hostile environments. However the ultimate application of this technology may result in tradeoffs among economic, environmental and social objectives.

ideas of the limits to growth literature in relation to sustainable development and notes that "the purpose of the economy, and therefore the proper subject of economics, is the promotion, not of production and consumption, but of welfare" (p. 284).

Boulding (1991) and Ayres (1993) considered sustainable development within long run and evolutionary time frames. Hannon, Ruth, and Delucia (1993), Pearce and Atkinson (1993), and van Pelt (1993) grappled with some of the measurement and evaluation difficulties which surround the sustainable development concept. Cambell (1996) discusses sustainable development from the viewpoint of community planners, noting that objectives and considerations will vary depending on the different perspectives of various disciplines.

Defining, measuring and accounting of sustainability has been recognized as a problem, and it will remain a difficult issue for the Corps and other agencies if they try to advance and assess sustainable development. One tool which is seen as important to such measurements is the system of national accounts, from which the GDP and other macroeconomic aggregates are determined. Most nations, including the United States, follow United Nations guidelines (United Nations Statistical Office 1968) in their national accounting. Ahmad, El Serafy, and Lutz (1989) edited a compendium of papers on modifying the national accounts to consider sustainable development. The United Nations (1993) prepared a handbook defining a satellite system of national environmental accounts as a way to link environmental information to the present system of national accounts.

Campbell (1996) and Pezzey (1989) among others have highlighted inherent conflicts among environmental protection, economic growth and social justice. They also note that sustainable development has been offered as an alluring, holistic concept for dealing with these conflicts, but one based on vague idealism. Many authors note that sustainable development cannot be reached directly, but only approximately and indirectly, through a sustained period of confronting and resolving the conflicts between the various goal areas.

Economists have the same problems with defining "sustainability" or "sustainable development" that every other profession has because the concept depends on highly uncertain notions of society's future goals and expectations. The rising stature of sustainable development constitutes an important and evolving challenge for natural resource and environmental economics. Since economics is so fundamental to the design and management of water resources systems, it is instructive to review some of the latest thinking among economists, as it relates to water and related land management issues. The special issue of the Land Economics Journal (1997) includes a series of papers that deal with the following themes:

- The role of natural resources in economic growth;
- Notions of intergenerational fairness;
- Environmental accounting;
- Ecological stability and resilience;
- Ties between ecosystems and economic development;
- Criteria for evaluating long-term environmental policies under uncertainty.

The crux of the philosophically different approaches between the water resources engineering profession and the economists is that the engineers view the issue of sutainability is one of adapting to known or predetermined future objectives of society, while the economists debate what these objectives should be, and how they are to measured. The fact that both the ASCE/UNESCO report and the special issue of the Land Economics Journal deal with many of the same issues and concepts of sustainability is not surprising, since water resources development has been greatly influenced by the evaluation constructs of the natural resources

and environmental economists. Furthermore, many of the same principles are applied in the development of environmental regulations, which greatly influence the types of environmental constraints that natural resources management agencies like the Corps, BLM, NRCS, etc., must operate under.

Water Resources Literature. The need to address multiple objectives, particularly those associated with some mix of the three elements of sustainable development, is well established in water resources literature. In 1964, the National Academy of Sciences commissioned a committee to appraise the water planning process. The committee report was critical of the action of prior decades and recommended a more unified approach to planning that would give social concerns and environmental protection full weight (Yoe, 1995, pg. 47). Maass, et al (1966) discuss objectives for designing water resources systems, stating "... a choice of objectives is open to the community from among a variety of combinations of economic efficiency and development, income redistribution by region or economic class, and aesthetic and other essentially non-economic values. The first step...is to determine which of these alternatives reflects the consensus of the community concerned with river development".

Water Resources Planning Act of 1965. The Water Resources Planning Act of 1965 (Section 103) provided for the coordinated planning of water and related land resources development. It established a policy to encourage the conservation, development, and utilization of the water and related land resources of the United States on a comprehensive and coordinated basis by the Federal government, states, localities, an private enterprise with the cooperation of all affected agencies, governments, individuals, corporations, business enterprises, and others concerned. The Act established the U.S. Water Resources Council, (42 U.S.C. 1962a) and authorized a national system of river basin commissions for major drainage areas[4]. The Council was expected to coordinate federal water project development consistent with priorities established within river basin management plans. The Council and the basin commissions sought to define plans for water management at different scales. Level A plans were National in scope, (e.g. the National Water Assessment and the North Atlantic Regional Water Resources Study), and were intended to set the most general policy and program direction. They were intended to identify and describe emerging national water problems and opportunities. In contrast, Level C plans were detailed formulations for individual projects. Level B plans, products of the river basin commissions, were more regional and set priorities for public action at all levels of government, extending beyond the narrow missions of the federal water development agencies.

The Act required the Council to establish principles, standards, and procedures for federal participants in the preparation of comprehensive regional or river basin plans and for the formulation and evaluation of federal water and related land resources projects (42 U.S.C. 1962a-2). The Council was also instructed to develop standards and criteria for economic evaluation of water resource projects (42 U.S.C. 1962a-2)[5]. The Council did not have a project review function (18 C.F.R. 701).

[4] Council members included the Secretaries of Interior, Agriculture, Army Health, Education and Welfare, and the Chairman of the Federal Power Commission, with the heads of other agencies participating on matters affecting their responsibilities are to be considered by the Council. The Chairman of the Council was designated by the President.

[5] At that time, the EPA focused on regulating and controlling point sources pollution, and used standards of performance in restricting waste discharges. There was no requirement to make an agency judgement on benefits and costs of different effluent standards or on the best way to restore water quality.

The **Principles and Standards** (P&S) publicized in the Federal Register in 1973 emphasized the need to balance the pros and cons of water resources development alternatives and stated two objectives for water resources planning. The goals were: 1) to enhance national economic development by increasing the value of the nation's output of goods and services and improving national economic efficiency, and, 2) to enhance the quality of the environment by management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems. In addition to the two planning objectives, there were four impact accounts: national economic development (NED), environmental quality (EQ), regional development (RD), and social well-being (SWB). Plan impacts on the different accounts were to be evaluated and displayed for consideration of tradeoffs between NED and EQ, and the effects of plans on regional development and social well-being. The obligation to formulate an EQ plan was eliminated from the final rules.

P&S objectives: 1) enhance national economic development, and 2) enhance the quality of the environment.

A number of changes were made to the P&S in 1980, and in 1983 the P&S were replaced by the Economic and Environmental **Principles and Guidelines** for Water and Related Land Resources Implementation Studies (P&G). The new document changed the focus from two coequal objectives to a single objective of contributing to national economic development *consistent with* protecting the nation's environment, pursuant to national environmental statues, applicable executive orders and other federal planning requirements. The P&G required use of procedures on economic benefit-cost analysis, to demonstrate that recommended projects were economically justified. While the use of NED is mandatory, the use of the other three accounts is dependent upon whether they contain information that may bear on decision making. The Corps follows these Principles and Guidelines in formulating and evaluating water resources implementation studies as part of the Civil Works program. Guidance is found in ER 1105-2-100. Further comparison and discussion of the similarities and differences between the P&S and the P&G with regard to application to sustainable development is provided in the next section.

P&G objective: contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statues, applicable executive orders and other federal planning requirements.

Federal Water Resources Planning Procedures. The P&G are the descendants of 50 years of evolution and refinement of evaluation principles that attempt to balance economic efficiency, environmental quality and social well being through the application of normative decision rules and integration of decision theory, benefit-cost theory, and social choice theory. They guide the formulation and evaluation studies of major federal water resources agencies[6] by providing the principles and procedures for consistent planning and evaluation for water resources studies.

The P&S, the predecessor to the P&G, empha sized the interrelationships of economic development, environmental health and social well-being. The P&S

P&S recommended the use of a *system of accounts* to display the beneficial and adverse effects of alternatives in order to provide a basis for comparing alternative plans.

[6] The P&G apply to the Corps of Engineers, the Natural Resources Conservation Service (formerly the Soil Conservation Service), the Bureau of Reclamation, and the Tennessee Valley Authority.

acknowledged that these factors are not mutually exclusive with respect to beneficial or adverse effects, and that decisions regarding plan recommendation should be made by considering the differences among alternative plans as to all their effects. The P&S pointed out the need to consider long-term and perhaps unintended effects, allowing that both beneficial and adverse long-term environmental and social well-being effects may extend beyond periods significant for national economic development or regional development analyses (Water Resources Council, 1973).

The P&S recommended the use of a system of accounts to display the beneficial and adverse effects of alternatives in order to provide a basis for comparing alternative plans. The P&G provides for a similar set of four accounts[7] . There are strong parallels between the four accounts of the P&G and P&S (national economic development (NED), environmental quality (EQ), regional development or regional economic development (RD/RED), and social well-being or other social effects (SWB/OSE), and the three elements of sustainable development (economic efficiency and prosperity, environmental protection, and social well-being and equity) (see Box 3). This connection suggests that the planning process in the P&G framework provides the intellectual foundation for an analytic basis for addressing issues of sustainability as part of Civil Works water resources planning and development. Additional discussion of the P&S, along with the P&G, is provided later in Chapter V of this report.

Box 3. P&G Accounts

- NED account - describes the beneficial and adverse effects on the economy;
- EQ account- displays the effects of alternative plans on environmental resources and attributes;
- RED account - displays changes in regional economic activity that result from each alternative plan;
- OSE account - displays information on effects on urban and community impact, life, health and safety factors, displacement and equity considerations not captured in the other three accounts.

Galloway Report. The "Galloway Report" (Interagency Floodplain Management Review Committee, 1994) recommended that the objective of maximizing national economic development (NED) in the Principles and Guidelines be expanded to optimize both economic and environmental objectives. This would reflect a return to the multiobjective tradeoff approach stated in the P&S which was used prior to 1983. This recommendation could be subsumed by a decision to implement sustainable development in the Civil Works program. Not only would national economic development and environmental quality become co-equal objectives to optimize, but the regional economic and social equity considerations could also be examined and evaluated. Tradeoffs between all the P&G accounts would be allowed, even required, in order to achieve the balanced advances toward all of the goals of sustainable development.

The National Environmental Policy Act. The concepts and philosophy of sustainable development are by no means completely new. The collection of issues, definitions, recommendations and concerns which are central to discussions of sustainable development today are really the melding or succession of ideas which have been in the national consciousness for decades. It is important to note, however, that while many

[7] The 1970 Flood Control Act identified four equal national objectives, that were the same as the four impact accounts, for use in water resources development planning. However, the P&S developed by the Water Resources Council in 1973, only included NED and EQ as objectives, and the P&G published in 1983 included one objective.

concepts related to sustainable development have been raised and discussed over a course of decades, the *implementation* of many of these issues has yet to be realized.

The National Environmental Policy Act of 1969 (NEPA) serves as a prime illustration of the early embodiment of sustainable development ideas. The sustainable development concept of an integrated, holistic approach to environmental management and maintaining human welfare is certainly a fundamental feature of NEPA. NEPA suggested the need to develop an approach which could balance societal demands for resource use with the need to protect and maintain resources. The policy of NEPA, derived from Title I of the Act (42 USC 4331) contains many of the same goals as sustainable development (see Box 4). The Act acknowledges the interrelationships between a healthy environment and human welfare, and the influences of population growth, urbanization, industrial expansion, resource exploitation and technological advances on the natural environment. The Act requires that alternatives to proposed actions be examined along with impacts of the alternatives and irreversible and irretrievable commitments of resources. NEPA also includes requirements for public involvement. These are ideas that have been reiterated in recent explorations of the ideas of sustainable development as well as ecosystem management.

Box 4. Sustainable Development Reiterates NEPA Policy

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;

(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

NEPA represented an attempt to develop a coordinated national approach for environmental considerations which spanned all agencies and pertinent programs. The Act recommends that federal agencies use a systematic, interdisciplinary approach, and develop methods and procedures to ensure that both quantitative and qualitative information and values are considered in decision-making. The question arises, then, why are many of same issues being discussed and recommendations not being implemented? In implementing NEPA, agencies have typically focused on the *procedural requirements* (EISs), rather than the underlying philosophy and spirit of NEPA. As a consequence, much of the core philosophy of NEPA has not been fulfilled in operational terms, and the full potential of NEPA has not been realized. Perhaps

there has been a lack of commitment or tools to address the complexity of analysis and tradeoffs, or perhaps the focus on procedures resulted in losing site of the goals. Also, NEPA advocates the inclusion of economic analysis and benefit-cost analysis as part of the decision process, a feature which is rarely included in EIS's (Stakhiv and Winslow, 1995.)

Chapter III. President's Council on Sustainable Development

The principal tenet of the report is that social, economic and environmental problems are intertwined and must be considered together, and that institutions and individuals must adopt a new way of thinking that inextricably links these issue areas. The report emphasizes a need to shift from single-minded advocacy to action that ensures progress in all three areas of economics, environmental health and social equity.

The President's Council on Sustainable Development (PCSD) was established in response to Executive Order 12852, June 1993. The Council was charged with conducting an open, collaborative dialogue on ways to meet the Brundtland Commission challenge. Sustainable development was broadly defined in the Executive Order as "economic growth that will benefit present and future generations without detrimentally affecting the resources or biological systems of the planet." The council was co-chaired by a vice president of Dow Chemical and the president of the World Resources Institute, and consisted of 23 additional members from leaders in industry, government, environment, Native Americans and civil rights organizations. The Secretaries of Agriculture, Interior, Energy, and Commerce, and the Administrator of the Environmental Protection Agency (EPA) were also members. The Council was supported by a number of task forces, including: eco-efficiency; energy and transportation; natural resources management and protection; sustainable development principles, goals and definitions; population and consumption; public linkage, dialogue and education; and sustainable agriculture.

A number of cities, with major sustainable development projects under way, served as case studies for the PCSD efforts. These included: Chattanooga, Tennessee; Seattle, Washington; Chicago, Illinois; and San Francisco, California. The case study experiences were thought to demonstrate that efforts to promote economic prosperity can also benefit the environment and promote social equity.

After three years of research and deliberation, the Council completed its first report in March 1996. The report, *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future,* contains a combination of philosophy, goals and numerous recommendations for advancing the goals of sustainable development. The definition of sustainability used by the PCSD is that which first appeared in the United Nations Brundtland Commissions report (World Commission on Environment and Development, 1987, pg. 43). The principal tenet of the report is that **social, economic and environmental problems are intertwined and must be considered together, and that institutions and individuals must adopt a new way of thinking that inextricably links these issue areas**. The report emphasizes a need to shift from single-minded advocacy to action that ensures progress in all three areas of economics, environmental health and social equity. The report also emphasizes collaborative decision making and recommends that government share leadership, control and information with business, schools, communities, non-governmental entities and individuals. The report promotes participation of those who will be significantly affected by institutional decisions through a framework that provides for equitable resolution of controversial issues. It challenges Congress to remove legislative impediments to more collaborative, local decision making. The concept of **stewardship** - defined as corporations and individuals embracing responsibility for actions that affect the environment and the overall quality of life - is also emphasized. All of these directives are incorporated into the ten National goals (See Box 5).

Box 5. National Goals for Achieving Sustainable Development[8]

Goal 1: HEALTH AND THE ENVIRONMENT: *ensure that every person enjoys the benefits of clean air, clean water, and a healthy environment at home, at work, and at play.* Indicators: the number of incidents of non-compliance with air and water quality standards; levels of toxic exposure; and disease and mortality rates.

Goal 2: ECONOMIC PROSPERITY: *sustain a healthy U.S. economy that grows sufficiently to create meaningful jobs, reduce poverty, and provide the opportunity for a high quality of life for all in an increasingly competitive world.* Indicators: GDP and NDP; employment and poverty rates; savings and investment rates; natural resources and environmental accounting; and worker productivity.

Goal 3: EQUITY: *ensure that all Americans are afforded justice and have the opportunity to achieve economic, environmental, and social well-being.* Indicators: income trends; and environmental and social equity measures.

Goal 4: CONSERVATION OF NATURE: *use, conserve, protect, and restore natural resources -- land, air, water and biodiversity -- in ways that help ensure long-term social, economic, and environmental benefits for ourselves and future generations.* Indicators: soil loss rates, acres of wetlands or grasslands, habitat loss; threatened or endangered species; introduction and spread of exotics; releases of nutrients and toxics; and emission of greenhouse gases and compounds that damage the ozone layer.

Goal 5: STEWARDSHIP: *create a widely held ethic of stewardship that encourages individuals, institutions, and corporations to take full responsibility for the economic, environmental, and social consequences of their actions.* Indicators: efficiency of materials use; waste reduction through source reduction, reuse, recovery and recycling; energy efficiency; and renewable resource use and regeneration.

Goal 6: SUSTAINABLE COMMUNITIES: *encourage people to work together to create healthy communities where natural and historic resources are preserved, jobs are available, sprawl is contained, neighborhoods are secure, education is lifelong, transportation and health care are accessible, and all citizens have opportunities to improve the quality of their lives.* Indicators: local per capita income and employment; crime rate; acres of public parks and green spaces; traffic congestion and use of public transportation; number of homeless; disparity in income between urban and suburban areas; resources for health care education and training; infant mortality rates.

Goal 7: CIVIC ENGAGEMENT: *create a full opportunity for citizens, businesses, and communities to participate in and influence the natural resource, environmental and economic decisions that affect them.* Indicators: measures of public participation; social capital; citizen participation; and use of civic collaboration via partnerships, community-based planning and goal-setting projects.

Goal 8: POPULATION: *move toward a stabilization of U.S. population.* Indicators: population growth rate; educational and income opportunities for women; number of unintended and teen pregnancies; immigration rates.

Goal 9: INTERNATIONAL RESPONSIBILITY: *take a leadership role in the development and implementation of global sustainable development policies, standards of conduct, and trade and foreign policies that further the achievement of sustainability.* Indicators: levels of international development and environmental assistance; environmental technology exports; and research on global environmental problems.

Goal 10: EDUCATION: *ensure that all Americans have equal access to education and lifelong learning opportunities that will prepare them for meaningful work, a high quality of life, and an understanding of the concepts involved in sustainable development.* Indicators: access to government, research and other public information; community participation opportunities for lifelong learning; curriculum reform and national standards that teaches principles of sustainable development; graduation and continuing education rates.

[8] These goals and indicators were suggested in the PCSD report.

National Goals for Sustainable Development. The Council outlined ten interdependent National goals, emphasizing that achievement of any one goal alone will not ensure achievement of sustainable development, nor that future generations will have at least the same opportunities to live and prosper that the current generation enjoys (Box 5). The Council noted that unmatched progress toward some goals could result in movement away from sustainable development. These goals, taken together, can be construed to provide a comprehensive national framework for sustainable development. To date, however, neither an implementation process nor a discussion and treatment of tradeoffs has been presented. Quantitative targets are neither developed in the report nor specified for either the overarching goals or the indicators. Instead, progress toward the goals is viewed as "movement in the proper direction" of the indicators. It is suggested that specific targets, if they are set, should be done so on a case-by-case basis at the local level. The Council's report provides examples of potential indicators which could be used to measure progress which the country is making toward achieving these goals. These indicators are largely directional (improve, increase, decrease...) and sometimes conceptual, with more work needed before they can be used as yardsticks for progress. The report encourages development of new indicators to more accurately measure the Nation's prosperity, which may be divided into "core" indicators and "urgent" indicators.

PCSD Policy Recommendations. The Council's first report identified a number of policy recommendations, some of which are potentially applicable to the Corps. Table 1 summarizes these policy recommendations, and identifies those most likely to be applicable to the Civil Works program. With some additional thought and innovation, it may be possible to identify ways in which the Corps, as a federal agency, can contribute to the majority of the goals. However, the PCSD acknowledged that while the report outlines 38 major policy recommendations and over 1,500 ways to achieve them, only about 25% of the recommended actions apply to the federal government, with the remaining 75% to be implemented by other levels of government, business, communities and individual citizens. Appendix A presents a matrix which illustrates relationships between the policy recommendations and the ten sustainable development goals. It demonstrates that most of the recommendations relate to multiple, if not most of the goals, helping to enforce the Council's point that the goals are interrelated.

The Council's report also provides "action points" including potential approaches for implementing the policy recommendations. The policy recommendation from the PCSD report which are most relevant to the Corps' Civil Works missions and activities are identified and marked in bold in Table 1. These policy recommendations are quoted in full in Appendix B, along with the action points for the recommendations which are relevant to the Corps' Civil Works mission and programs. In addition, Appendix B provides examples of Corps activities that are consistent with the recommendations or could support the recommendations.

Table 1. *PCSD* POLICY RECOMMENDATIONS (With Those Applicable to the Civil Works Program Identified)		
Policy Recommendation[9]	**Description**	**CW Applicable?**[10]
2.1 Increased Cost-Effectiveness of Existing Regulatory System	**Accelerate efforts to evaluate existing regulations and to create opportunities for attaining environmental goals at lower economic costs.**	**Yes**
2.2 Alternative Performance-Based Management System	**Create a bold, new alternative environmental management system designed to achieve superior environmental protection and economic development that relies on verifiable and enforceable performance-based standards and provides increased operational flexibility through a collaborative decision-making process.**	**Yes**
2.3 Extended Product Responsibility	**Adopt a voluntary system that ensures responsibility for the environmental effects throughout a product's life cycle by all those involved in the life cycle. The greatest opportunity for extended product responsibility rests with those throughout the commerce chain - designers, suppliers, manufacturers, distributors, users, and disposers - that are in a position to practice resource conservation and pollution prevention at lower cost.**	**Yes**
2.4 Shift in Tax Policies	Begin the long-term process of shifting to tax policies that - without increasing overall tax burdens - encourage employment and economic opportunity while discouraging environmentally damaging production and consumption decisions.	
2.5 Subsidy Reform	**Eliminate government subsidies that encourage activities inconsistent with economic, environmental, and social goals.**	**Yes**
2.6 Use of Market Incentives	**Make greater use of market incentives as part of an overall environmental management system to achieve environmental and natural resource management objectives, whenever feasible. This system must provide for verification, accountability, and the means to ensure that national standards are met or exceeded.**	**Yes**
2.7 Intergovernmental Partnerships	**Create intergovernmental partnerships to pursue economic prosperity, environmental protection, and social equity in an integrated way.**	**Yes**
3.1 Better Information Management	**Improve the collection, organization, and dissemination of information to reduce duplication and streamline reporting requirements while giving decision makers information related to economic, environmental, and equity goals.**	**Yes**
3.2 Better Science for Improved Decision Making	**Strengthen the base of scientific knowledge and increase its use by decision makers and the general public.**	**Yes**

[9] Recommendation numbers: First # = Chapter; Second # = number of recommendation within the chapter.

[10] Appendix B elaborates on the relevance to or potential for contributions from the Civil Works program..

3.3 Improved Access to Information	**Adopt open information policies and practices, recognizing that disclosure and active dissemination of information should be the rule, not the exception. Adopt policies that increase access to public information for all segments of society and encourage the development of the National Information Infrastructure by the private sector in ways that improve access for all.**	**Yes**
3.4 Information for Sustainable Living	**Endorse and promote awareness of the economic, environmental, and social benefits of sustainable practices - such as more efficient resource use in government, the private sector, and the home - and encourage local governments, businesses, and community groups to engage people in making these improvements.**	**Yes**
3.5 Indicators of Progress	**Develop indicators of progress toward national sustainable development goals and regularly report on these indicators to the public.**	**Yes**
3.6 Supplemental National Income Accounts	**Establish a supplemental system of satellite national income accounts that provides integrated measures of the economy, the environment, and the natural resource base.**	**Yes**
3.7 Environmental Accounting	Develop and adopt accounting practices that link environmental costs with the products, processes, and activities that generate them to provide better information for business decisions.	
3.8 Formal Education Reform	Encourage changes in the formal education system to help all students (kindergarten through higher education), educators, and education administrators learn about the environment, the economy, and social equity as they relate to all academic disciplines and to their daily lives.	
3.9 Non-formal Education and Outreach	Encourage nonformal access to information on, and opportunities to learn and make informed decisions about, sustainability as it relates to citizens' personal, work, and community lives.	
3.10 Strengthened Education for Sustainability	Institute policy changes at the federal, state, and local levels to encourage equitable education for sustainability; develop, use, and expand access to information technologies in all educational settings; and encourage understanding about how local issues fit into state, national, and international contexts.	
4.1 Community-Driven Strategic Planning	**Create a community-driven, strategic planning process that brings people together to identify key issues, develop a vision, set goals and benchmarks, and determine actions to improve their community**.	**Yes**
4.2 Collaborative Regional Planning	**Encourage communities in a region to work together to deal with issues that transcend jurisdictional and other boundaries.**	**Yes**
4.3 Building Design and Rehabilitation	**Design and rehabilitate buildings to use energy and natural resources efficiently, enhance public health and the environment, preserve historic and natural settings, and contribute to a sense of community identity.**	**Yes**
4.4 Community Design	Design new communities and improve existing ones to use land efficiently, promote mixed-use and mixed-income development, retain public open space, and provide diverse transportation options.	
4.5 Community Growth Management	**Manage the geographical growth of existing communities and siting of new ones to decrease sprawl, conserve open space, respect nature's carrying capacity, and provide protection from natural hazards.**	**Yes**

4.6 Creation of Strong, Diversified Local Economies	Apply economic development strategies that create diversified local economies built on unique local advantages to tap expanding markets and technological innovation.	
4.7 Training and Lifelong Learning	Expand and coordinate public and private training programs to enable all people to improve their skills to match future job requirements in communities on a continuing basis.	
4.8 Environmental Economic Development	Capitalize upon economic development opportunities from businesses and industries that target environmental technologies, recycling, and pollution prevention to create jobs.	
4.9 Redevelopment of Brownfield Sites	**Revitalize Brown fields - which are contaminated, abandoned, or under used land - by making them more attractive for redevelopment by providing regulatory flexibility, reducing process barriers, and assessing greenfield development to reflect necessary infrastructure costs.**	**Yes**
5.1 Collaborative Approaches	**Use voluntary, multi stakeholder, collaborative approaches to protect, restore, and monitor natural resources and to resolve natural resources conflicts.**	**Yes**
5.2 Ecosystem Integrity	**Enhance, restore, and sustain the health, productivity, and biodiversity of terrestrial and aquatic ecosystems through cooperative efforts to use the best ecological, social, and economic information to manage natural resources.**	**Yes**
5.3 Incentives for Stewardship	**Create and promote incentives to stimulate and support the appropriate involvement of corporations, property owners, resource users, and government at all levels in the individual and collective pursuit of stewardship of natural resources.**	**Yes**
5.4 Agricultural Resources Management	Manage and protect agricultural resources to maintain and enhance long-term productivity, profitability, human health, and environmental quality.	
5.5 Achievement of Year 2000 Sustainable Forest Management Goal	**Establish a structured process involving a representative group of stakeholders to facilitate public and private efforts to define and achieve the national goal of sustainable management of forests by the year 2000.**	**Yes**
5.6 Restoration of Fisheries	**Restore habitat and eliminate over fishing to rebuild and sustain depleted wild stocks of fish in U.S. waters.**	**Yes**
5.7 Natural Resources Information	**Strengthen information on natural resources by integrating and building on existing international, federal, state, and tribal natural resources and biodiversity inventories, assessments, and databases; and by developing and using compatible standards, methods, and protocols.**	**Yes**
5.8 Biodiversity Conservation	**Create voluntary partnerships among private landowners at the local and regional levels to foster environmentally responsible management and protection of biological diversity, with government agencies providing incentives, support, and information.**	**Yes**
6.1 Greater Access to and Availability of Services	Expand access to and availability of the family planning and reproductive health services needed to prevent unintended pregnancies and ensure that all Americans have the information and services they need to decide freely and responsibly the number and spacing of their children.	

6.2 Expanded Opportunities for Women	Create partnerships to enhance opportunities for women, giving special attention to socioeconomic factors that result in disproportionately high levels of unintended and teen pregnancy among disadvantaged segments of society.	
6.3 Improved Immigration Policies	Encourage the Commission on Immigration Reform to continue its work, and support research to promote the implementation and fair enforcement of responsible immigration policies.	
7.1 International Leadership	**Promote economic and national security by actively participating in and leading cooperative international efforts to encourage democracy, support scientific research, and enhance economic development that preserves the environment and protects human health.**	**Yes**

Sustainable Development Indicators. Work is underway by an Interagency Working Group on Sustainable Development Indicators (SDI Group) to develop measures of progress towards sustainable development in the United States[11]. The group identified an initial set of 40 economic, environmental and social indicators that represent a cross-section of many of the issues judged to be relevant to sustainable development. A report summarizing the SDI Group's work from 1996-1998 can be found at *http://www.sdi.gov*. The set of indicators is intended to be used to determine whether the Nation is proceeding in the right direction on the path of sustainable development. According to the SDI Group, comparison of the number of indicators showing a positive trend with the number showing a negative trend will provide a general indication as to whether the Nation is moving in the right direction.

Each type of indicator helps assess sustainablity in a different way. Some reflect current conditions to indicate progress toward near-term objectives (gross domestic product (GDP), crime rate, unemployment rates, educational achievement rates). Some provide information on assets, resources or liabilities that we pass on to the future (water resources, quantity of spent nuclear fuel), or information on processes and driving forces that affect current or long-term conditions (utilization of fisheries, emission of greenhouse gases, investment in research and development).

The set of indicators identified by the SDI Group was selected from an inventory of more than 400 indicators identified by Federal agencies, the PCSD, the United Nations Commission on Environment and Development (UNCED) (*http://un.org/esa/agenda21/natlinfo/about.html*), the World Bank, other countries, and various non-profit group, businesses and communities. The indicators are organized into three major categories representing (1) long-term endowments and liabilities, (2) processes, and (3) current results. These categories are divided into sub-categories for the economy, the environment, and society. This categorization is intended to reflect the multidisciplinary, intergenerational, and evolving nature of sustainable development (Tables 2 and 3).

[11] Formation of the SDI Group by the Administration in 1997 formalized the activities of a group of agency representatives who had been meeting informally since 1994 examining various approaches for developing a set of sustainable development indicators. The SDI Group reports to the CEQ and is supported through voluntary contributions of staff and resources by participating Federal agencies.

Table 2. Economic, Environmental, and Social View of Indicators (SDI Table 4.1)		
Economic	***Environmental***	***Social***
Capital Assets	Surface Water Quality	U.S. Population
Labor Productivity	Acres of Major Terrestrial Ecosystems	Children Living in Families with Only One Parent Present
Federal Debt to GDP Ratio	Contaminants in Biota	Teacher Training Level and Application of Qualifications
	Quantity of Spent Nuclear Fuel	Contributing Time & Money to Charities
Energy Consumption Per Capita & Per $ of GDP	Status of Stratospheric Ozone	Births to Single Mothers
Materials Consumption Per Capita & Per $ of GDP	Greenhouse Climate Response Index	Educational Attainment by Level
Inflation	Ratio of Renewable Water Supply to Withdrawals	Participation in the Arts & Recreation
Investment in R&D as a Percentage of GDP	Fisheries Utilization	People in Census Tracts with 40% or Greater Poverty
Domestic Product	Invasive Alien Species	Crime Rate
Income Distribution	Conversion of Cropland to Other Uses	Life Expectancy at Birth
Consumption Expenditures per Capita	Soil Erosion Rates	Educational Achievement Rates
Unemployment	Timber Growth to Removals Balance	
Home Ownership Rates	Greenhouse Gas Emissions	
Percentage of Households in Problem Housing	Identification & Management of Superfund Sites	
	Metropolitan Air Quality Nonattainment	
	Outdoor Recreational Activities	

Table 3. Long-term Endowments & Liabilities, Processes, & Current Results View of Indicators (SDI Table 4.2)		
Long-term Endowments and Liabilities	*Processes*	*Current Results*
Capital Assets		Domestic Product
Labor Productivity	Energy Consumption Per Capita & Per $ of GDP	Income Distribution
Federal Debt to GDP Ratio	Materials Consumption Per Capita & Per $ of GDP	Consumption Expenditures per Capita
Surface Water Quality	Inflation	Unemployment

Acres of Major Terrestrial Ecosystems	Investment in R&D as a Percentage of GDP	Home ownership Rates
Contaminants in Biota	Ratio of Renewable Water Supply to Withdrawals	Percentage of Households in Problem Housing
Quantity of Spent Nuclear Fuel	Fisheries Utilization	Metropolitan Air Quality Nonattainment
Status of Stratospheric Ozone	Invasive Alien Species	Outdoor Recreational Activities
Greenhouse Climate Response Index	Conversion of Cropland to Other Uses	Crime Rate
U.S. Population	Soil Erosion Rates	Life Expectancy at Birth
Children Living in Families with Only One Parent Present	Timber Growth to Removals Balance	Educational Achievement Rates
Teacher Training Level and Application of Qualifications	Greenhouse Gas Emissions	
	Identification & Management of Superfund Sites	
	Contributing Time & Money to Charities	
	Births to Single Mothers	
	Educational Attainment by Level	
	Participation in the Arts & Recreation	
	People in Census Tracts with 40% or Greater Poverty	

PCSD Task Forces and Reports. After completion of the *Sustainable America* report, President Clinton requested that the Council continue working to implement some of its recommendations. The Council formed four task forces to investigate implementation of a number of the issues and recommendations in their report in greater detail. The task forces include:

Task Force on Climate Change - to advise the President on domestic policy options and activities that could reduce greenhouse gas emissions using approaches that maximize societal benefits, minimize economic impacts, and are consistent with U.S. international agreements.

Environmental Management Task Force - to advise the President on the next steps in building the new environmental management framework of the 21st Century.

International Task Force - to advise the President on policies that foster U.S. leadership in sustainable development internationally. Specifically, it shall promote the creation and continuation of national sustainable development councils around the world.

Metropolitan and Rural Strategies Task Force - to encourage and support local and regional collaboration among Federal, State, and local government agencies; public interest and community groups; and businesses to advance sustainable development in metropolitan and rural communities.

A number of reports and publications have been prepared by the PCSD. These reports are available at *http://www.sdi.gov*. The first report, Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future, has been used as the basis for debates about the future of urban and rural America, and to help build the "smart growth" movement as people get together to create more livable communities. In its most recent report, *Towards a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21St Century* (May 1999), the PCSD has sought to articulate the goal of a sustainable America in terms of examples of success and proposals for national policy. It focuses on environmental management, and metropolitan and rural strategies, and climate change and international leadership. Reports and publications prepared by the PCSD are listed in Box 6.

Box 6. PCSD Publications

➢ *Towards a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century*, May 1999

➢ *Sustainable America: A New Consensus for Prosperity, Opportunity, and A Healthy Environment for the Future*, February 1996

➢ *Building on Consensus: A Progress Report on Sustainable America*, January 1997

➢ *The Road to Sustainable Development: A Snapshot of Activities in the United States of America*, March 1997

➢ Task Force Reports from first phase of PCSD:
- Eco-Efficiency, 1996
- Energy and Transportation, 1996
- Population and Consumption, 1996
- Public Linkage, Dialogue, and Education, February 1997
- Sustainable Agriculture, 1996
- Sustainable Communities Task Force Report, Fall 1997
- Natural Resources, Spring 1999

➢ Eco-Industrial Park Workshop Proceedings [held October 17-18, 1996], February 1997

➢ Proceedings of Extended Product Responsibility Workshop [held October 21-22, 1996], February 1997

➢ Lessons Learned from Collaborative Approaches, April 1997

Chapter IV. Sustainable Development Elements and Themes

Future progress requires that the United States broaden its commitment to environmental protection to embrace the essential components of sustainable development: environmental healthy, economic prosperity, and social equity and well-being. This means reforming the current system of environmental management and building a new and efficient framework based on performance, flexibility linked to accountability, extended product responsibility, tax and subsidy reform, and market incentives (PCSD, 1996, pg. 25).

Elements of Sustainable Development. The Council's report identifies three overarching areas in which to strive for balance as part of promulgating the principles of sustainable development. These areas are: economic efficiency, environmental health, and social well-being and social equity. The Council's report asserts that the three areas are interdependent and must be pursued "simultaneously" and in a "balanced" way if sustainable development goals are to be achieved. In this report, these three areas are referred to as "elements" of sustainable development, and are discussed below under the headings of economic sustainability, environmental sustainability, and social sustainability.

Economic Sustainability. The PCSD the goal of economic prosperity involves sustaining *a healthy U.S. economy that grows sufficiently to create meaningful jobs, reduce poverty, and provide the opportunity for a high quality of life for all in an increasingly competitive world (PCSD, pg 12).* Sustainable economic development means building a local economy that is both stable and diversified. The economy should be based on future-oriented enterprises that can endure and flourish within changing global and national economies without relying on artificial supports or subsidies (except where these are needed temporarily to cushion the effects of economic change, such as plant closings or layoffs, or are offset by gains to the community in other area (Richardson, 1994)).

S*ustained economic growth is dependent on a clean and healthy environment* (PCSD, pg. 6). Economic sustainability includes *economic growth that is distributed fairly and that does not degrade the environment.* It requires recognition that economic growth occurs within some limits and is ultimately limited by the carrying capacity of the environment.[12] Economic sustainability involves decision making that considers the economic, environmental and social costs of development, and recognizes that the economy cannot be divorced from the natural resource base which supports it.

Corps Civil Works water resources studies have historically emphasized the economic objectives and aspects of development, but not without consideration of other factors. An emphasis on economic efficiency was formally imposed through the Flood Control Act of 1936, which instituted an economic benefit-cost test for flood damage reduction projects. Both the P&S and the P&G which the Corps currently uses to guide its water resources planning and development studies, include the federal objective of contributing to national economic development (NED), consistent with protecting the environment. In addition, the P&G also outlines a six step planning process, additional formulation criteria, accounting standards, and establishment of four accounts in which to display the effects of alternative plans (see Box 3, Chapter II). The planning process can

[12] Daly (1990) recommends "economic development" without "economic growth" to highlight that there are ultimate limits.

be used with any federal objective, sets of criteria, or accounting standards[13]. For example, the P&S, which was used from 1973-1980, employed the planning process to address both national economic and environmental quality objectives. Other objectives or combinations of objectives could also be identified. Since 1983, under the P&G, the planning process has been primarily applied to studies with the objectives of maximizing net national economic benefits (consistent with environmental requirements). While exceptions are available, this single, economic objective has focused the Corps primarily on economic development -- until recently when objectives related to ecosystem restoration were elevated as a programmatic priority. Still, this primary focus, has not resulted in the Corps ignoring environmental and social concerns. Consideration of local and other objectives and resource considerations is afforded through the authorization and appropriation processes through which Corps projects must pass; the public involvement processes which is integral to water resources planning; sound engineering judgment; and environmental impact assessment. Thus, while sustainable development is not explicitly among the evaluation and decision criteria used in Corps decision making, the planning process and the basic evaluation framework contain many of the elements of a structured approach to dealing with sustainable development.

Figure 1 provides a graphical representation which may be useful in considering the kinds of tradeoffs that the PCSD is aiming for as reflected in the application of two planning concepts: 1) planning as a multi-objective tradeoff endeavor, in this case a tradeoff between two objectives, economic development (NED) and environmental quality (EQ); and 2) planning for maximization a single objective (e.g NED), subject to other constraints (e.g. EQ). The curve in the upper portion of the figure illustrates tradeoffs between NED and EQ given several different hypothetical solutions or scenarios (A-E). The lower portion of the figure schematically represents the increase in the major environmental protection laws which serve to define environmental quality objectives as well as establish the conditions and criteria which act as constraints to economic development. Over time, the zero reference point for environmental quality can be seen to move to the right for even single purpose

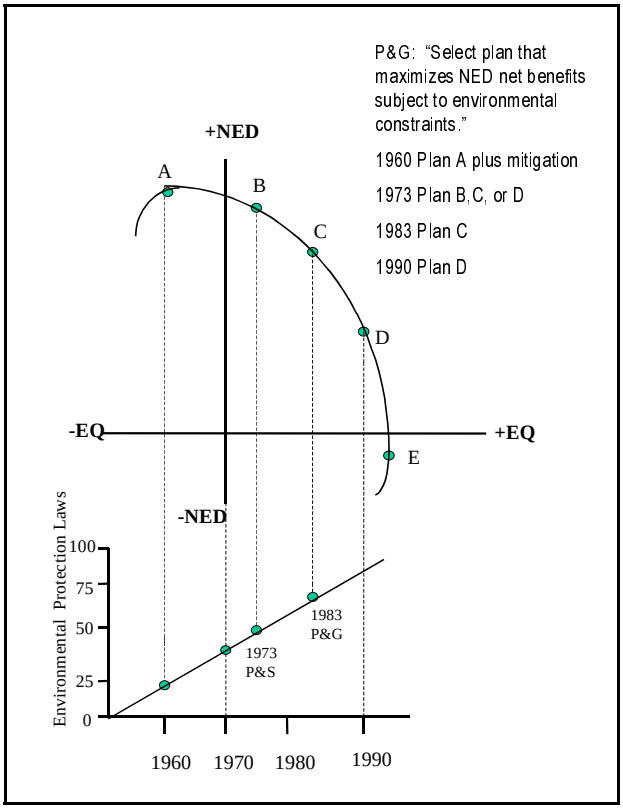

Figure 1. NED-EQ Tradeoffs (Stakhiv and Major, 1997).

[13] The Corps uses a six step planning process: 1) specify problems and opportunities, 2) inventory and forecast conditions, 3) formulate alternative plans, 4) evaluate effects of alternative plans, 5) compare alternative plans, 6) select recommended plan. Other organizations and authors have divided the process differently, making a four step or seven step or some other length process. However, these differences are largely semantic, and it is the idea of a structured, comprehensive, iterative, information-based planning process which is important. This planning process is especially valuable because it is a well documented and well tested example of a general planning model that could be applied to more abstract exercise of planning for sustainable development.

economic development projects because the enacted environmental laws serve to achieve an implicit tradeoff function between NED and EQ. So, even though the current P&G would maximize NED subject to environmental protection criteria, the decision outcome may be superior to the older more conceptually appealing P&S tradeoffs. Furthermore, the decisions made under the P&G have additional dimensions not represented here, e.g. social, regional economic, financial and equity considerations and objectives, but which are imposed during the course of formulating and evaluating alternatives. Each alternative solution results from a different mix of social needs and equity considerations.

Environmental Sustainability. The second element of sustainable development is the maintenance, protection and restoration of environmental health and integrity. *"Continued prosperity depends on the country's ability to protect its natural resource base and learn to use it in ways that do not diminish it"* (PCSD, pg.10).

As the human population has continued to increase, demands and adverse impacts on natural resources have also increased. Cumulative impacts of human activities on the natural landscape have damaged, destroyed, or jeopardized many ecosystems, ecological functions, species, and natural resources. The public and political sentiment with respect to demands on, and values of, natural resources appear to be changing. There is growing recognition and appreciation that increased rates of habitat destruction, fragmentation, and land use conversions have led to substantial losses of biodiversity and extinction of species, which in turn have led to losses of ecosystem structure and functions important to society. In addition to demanding tangible resource outputs such as food, fuel and fiber, there is growing concern about the quality of natural resources and the availability of these resources for future generations. While economic development and environmental protection may have been considered at odds or mutually exclusive, there is an emerging consensus that sustained economic development must be supported by a healthy environment. In order for economic development to proceed - and to do so in a sustainable fashion - development can no longer be divorced from the natural resource base that supports it. Nor should efforts to accomplish environmental objectives be conceived without explicit attention to the economic and social implications if the goals of sustainable development are to be advanced.

The Council describes a number of ways to foster sustainable development and improve the current system of environmental management. Among these are:

- Fostering a more efficient and effective regulatory system that is performance-based;
- Supporting innovation in environmental management and providing incentives for stewardship and flexibility in regulation;
- Improving the ability to provide a full accounting of natural resource depletion costs;
- Restoring habitats and ecological systems and functions;
- Protecting biodiversity and ecological integrity;
- Supporting the development and application of ecological indicators.

The Council asserts that fostering an **ethic of stewardship**, in which individuals, corporations and agencies each assume a responsibility for the condition of the environment and natural resource base, is key to achieving this goal. *Principles of stewardship help define appropriate human interaction with the natural world. Stewardship is more of a perspective, than a science; it is a set of values that applies to a variety of decisions. It provides moral standards that cannot be imposed, but can be taught, encouraged, and reinforced. Instilled in individuals and institutions, it can motivate resolve for voluntary change. Principles of stewardship can illuminate complex policy choices and guide individuals toward the common good* (PCSD, pg. 8).

According to the Council, stewardship involves:

- Collaborative planning and management
- Protection of water quality, biodiversity and ecological integrity
- Full accounting of natural resource depletion costs
- Consideration of future generations' needs
- Restoration of habitats and ecological systems and functions.

The Corps, as a prominent water resources agency, has unique opportunities to enhance, protect and restore aquatic ecosystems, and to advance facets of environmental stewardship. The PCSD recommendations regarding environmental sustainability fall under the following general policy directions - the Corps is contributing to nearly all of these areas through the Civil Works program:

- Collaborative approaches
- Ecosystem approaches
- Incentives for stewardship
- Sustainable agriculture
- Sustainable forests
- Replenishing and protecting fisheries
- Natural resources information
- Partnerships for conservation

The PCSD report recommends that when making decisions concerning public infrastructure projects, agencies should weigh the economic benefits of the project against the costs -- incorporating both market and non-market costs, such as net impacts on the ecological system. In addition, *"[e]xisting projects should be reengineered to the extent possible to restore ecological functions and habitat, using cost-benefit analysis, including both market and nonmarket and ecological values"* (PCSD, pg. 124). The Council suggests that well-developed market incentives, used in conjunction with an appropriate regulatory framework, can provide the most efficient approach to natural resource management, as well as contribute to development of stewardship and accountability. The Corps can, and is contributing to these recommendations through water resources planning initiatives, as well as its Regulatory program functions, particularly as these activities are implemented in a coordinated manner through watershed and other types of comprehensive studies. Wetland mitigation banking is an idea that combines ecosystem restoration with market-based incentives. In addition, tools such as IWP-Plan (Robinson, et al, 1995) can assist in formulating and comparing alternative plans. This model can combine solutions to planning problems and calculate the additive effect of each combination or "plan". It can assist in comparison by conducting cost effectiveness and incremental cost analysis, identifying the plans which are the best financial investments and displaying the effects of each on a range of decision variables. Model can be found at this web site: *http://www.wrsc.usace.army.mil/iwr*, see "IWR-PLAN Decision Support Software".

Ecosystem management has been described as managing nature to achieve a particular state or condition, and it is different from managing nature to produce goods and services. However, as humans are part of the ecosystem, these goals (i.e. managing to achieve a particular condition and to produce goods and services) need not be mutually exclusive. Sustainable development concepts suggest striving to achieve an ecosystem state or condition that would provide for goods and services while acknowledging that there are limitations to both the system resiliency and the production level of sustained goods and services.

The Council's report contains a number of suggestions for addressing and strengthening environmental aspects of sustainable development. Managing and protecting the natural resource base is viewed as an integral key to sustainable development. The Corps has the ability, the opportunity, and in many cases, the obligation to support environmental health and sustainability, especially in the protection and restoration of aquatic ecosystems. The environmental aspects of sustainable development are broader than the environmental quality account as the Corps currently views it. The Corps will be challenged to incorporate more comprehensive environmental concepts, such as biodiversity and ecosystem integrity into the planning and analysis process. The Council's recommendations provide further emphasis and justification for the Corps to continue to integrate environmental considerations and opportunities into its traditional mission areas. They also can be viewed to endorse continuing work to advance capabilities to use information about environmental responses into decision making.

Social Sustainability and Equity. Social well-being and equity, the third element of sustainable development identified in the PCSD report, has been described variously using the terms: "social well-being," "social equity," "environmental justice," "social justice," "fairness", "social goals", "community" and "social welfare". Each of these expressions represents some component of social sustainability, depending on the context of the discussion.

Examining both the PCSD report and other sources can enhance the understanding of the various aspects of this element of sustainable development. An examination reveals that fostering social sustainability includes acknowledgment that: *"Strong, vital communities are the foundation of a healthy society"* (PCSD), and involves the "*satisfaction of basic human needs for food, shelter, education, work, income, and safe living and working conditions"* (Richardson 1994).

Consideration of factors that contribute to social sustainability is included in water resource planning guidance. For example, social well-being (SWB) was characterized in the P&S, as contributions to the equitable distribution of real income and employment and to other social opportunities (see Box 7). The P&S specified that, for the most part, these benefits would be described in non-monetary terms since they are integrally related to the basic values and goals of society. However, the normal market exchange process produces monetary values which can aid in measuring the distributional impacts of plans on real incomes. The P&S acknowledged limitations in the ability to evaluate effects on SWB, stating that there are many complex definitional, data and measurement problems. Innovative approaches and documentation of the approaches used in reports were encouraged.

Box 7. Social Well-Being Considerations (P&S, 1973)

- Effects on real income
- Effects on security of life, health, and safety. (e.g. reducing flood risk, drought, other disaster affecting the security of life health and safety; reducing exposure to water and air pollution
- Educational, cultural and recreational opportunities
- Effects on emergency preparedness (water transportation, supplies, power, food, dispersal)
- Other effects that do not fit in the categories of national economic development, regional development or environmental quality.

In the P&G, there is an account called "other social effects"(OSE), which can be used as *a means of displaying and integrating into water resources planning information on alternative plan effects from perspectives that are not reflected in the other three accounts* (U.S. Water Resources Council, 1983, pg 12). The specified categories of effects include factors

related to social well being such as: urban and community impacts; life, health, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation (U.S. Water Resources Council, 1983, pg 12).

Equity is an overarching principle that addresses and suffuses the manner in which the other nine PCSD goals (See Box 5) are attained. The PCSD report stated that *equity is such an important goal that it worked to weave this priority into each element* of its report (pg. 16). As characterized in Goal 3 of the PCSD report equity is to: *Ensure that all Americans are afforded justice and have the opportunity to achieve economic, environmental and social well-being*. (PCSD, 1997, page 12). The PCSD acknowledges that measuring fairness and equality of opportunity throughout a population is complex.

Equity, in common terms, is defined as the state or ideal of being fair, just, and impartial. As used in economics, "an allocation is equitable if no agent prefers any other agent's bundle of goods to his or her own" (Varian 1990; p. 533). In practice, equity, like morality, justice and ethics is described mostly in procedural terms. This approach reflects the basic principle of equal treatment before the law, i.e. similar cases must be dealt with in a similar manner. There is an elemental virtue in the uniform applications of rules, procedures, criteria and standards. A uniform, procedural approach, however, does not guarantee uniformity of outcomes. An important sub-component of *procedural equity*, as applied to water resources management, is the principle of direct participation or representation in decision making by those who are affected by the decisions, particularly in the planning process. The basic assumption is that an open, democratic planning process will help achieve equitable outcomes, by ensuring that the objectives, alternatives, tradeoffs and impact analyses reflect a wide range of social needs and preferences, and that public interest values and preferences will be used to guide the tradeoffs and choices.

Process is often used as one proxy for equity, for which there is no suitable metric. The evolution of federal water resources planning, especially from the inception of the Water Resources Planning Act of 1965, has been one of greatly expanding **procedural equity** or access to, and influence of the process. This has been accomplished through the progressive evolution of public involvement in the planning process, to the extent that public interest groups are intimately involved in scoping of problems, development of planning objectives, participation in technical task committees, formulation of alternatives, and in reviewing and commenting on the reports, environmental assessments and impact statements. The public is also involved in the inception of the Congressional project study authorization and appropriation process, as well as in the regulatory reviews associated with each of the requisite permits and approvals from a host of federal, state and local agencies.

Another aspect of equity is that associated with the outcomes of decisions or **consequentialist equity**. This deals with the distribution of adverse impacts and costs, as well as identifying the bearers of benefits of actions, regulations or water projects. There are several broad traditions defining equity in this sense (Young, 1994), and all are conceptually valid, but substantially different. Among them are parity, proportionality, priority, and classical utilitarianism. There is no complete consensus on which, if any of these approaches alone comprise an adequate criterion for defining consequentialist equity. In practice, each is practiced in nuanced and subtle ways. A more detailed discussion of these views or policies regarding consequentialist equity is provided in Appendix C.

Social well-being and equity are sometimes thought to be ignored as part of the Civil Works water resources development because of emphasis on the national economic development objective. However, social well-being and equity considerations (both procedural and consequentialist) are implicit and integral to the structure of the planning, evaluation and decision making processes and procedures that have evolved in the

25 years since the inception of NEPA (1969) and the Water Resources Planning Act (1965). There are numerous large and small, subtle and discrete mechanisms in contemporary water resources planning and management that can be enumerated to illustrate consideration of social well-being and reflect the principles of procedural or consequentialist equity. The P&G integrates the principles of economic benefit-cost theory, social choice theory and decision theory and provides a substantive framework which can help in analyzing projects for their respective contribution to the goals of sustainable development, in an socially equitable manner. However, while the framework of the P&G affords this type of analysis, current implementation of the framework for major traditional infrastructure investment projects has involved a reduced rigor of analysis of information in accounts other than NED. This is attributed to, at least in part, the emphasis on reducing study schedules and costs. In addition, there seems to be an inconsistent understanding of how and when to use this information. Still, a number of studies are underway which will have the opportunity to examine non-traditional approaches including non-structural flood damage reduction, environmental restoration and watershed planning. These studies will invariably involve information from the EQ, RED and OSE accounts for justification of the most cost-effective option and in decision-making.

It is not entirely coincidental that the principal federal water resources planning objectives of economic efficiency, environmental quality, social well-being and regional development devised in the 1950s by economists and political scientists are comparable to the contemporary notions reflected in the PCSD report. These principles are applicable to all public investment and regulatory programs. As useful as the federal water resources planning guidelines are in providing a practical, tangible and implementable framework for grasping and organizing the vague and dispersed goals of the PCSD, it should be understood that there are many more powerful and effective instruments for achieving social well-being and equity than through the mechanism of water resources projects. The political system, through the budgetary process, is one of the foremost mechanisms for allocation, distribution and redistribution of social welfare. The tax code is an influential mechanism for achieving equity. The allocation and distribution of water projects is inherently a political choice that rests on basic democratic representational equity. Water resources planners lay out the impacts (distribution of benefits and costs - both monetary and non-monetary) and the tradeoffs and choices are made through the political process with public participation.

Some approaches that could be used if the Corps were given the charge to more explicitly incorporate social equity into its missions include:

- examination of extending the NEPA process
- using the Other Social Effects (OSE) account more explicitly
- further development of public participation and shared vision processes
- partnering with other agencies whose primary missions are to advance social well being and equity.

Further discussion of these approaches is included in Appendix C.

Themes of Sustainable Development and Criteria for Developing Policy Tools. There is no single set of principles for implementing sustainable development. There are, however, a number of important themes which reappear in some form in much of the literature and many of the reports. These themes are summarized in Box 8.

Box 8. Recurring Themes of Sustainable Development

- Development of shared visions of outcomes and approaches.
- Consideration of multiple objectives in federal infrastructure and natural resource initiatives.
- Consideration and acknowledgment of both positive and negative consequences of proposed actions.
- Improvement of capabilities for risk assessment, and making information about environmental risk available and understandable; improving the use risk profiles to identify and set priorities).
- Better information management and sharing; reduce duplication and streamline reporting requirements; foster consistent data collection and reporting standards and methodologies. Improve accessibility of data and information. Strengthen science information; expand access to information; improve ability to measure progress toward national goals.

The PCSD call for the creation of a new framework for integrating economic, environmental, and social well-being and equity goals. Such a framework would need to build on the strengths and overcome the limitations of current systems and recognize interrelationships among economic, environmental, and social policies (PCSD, pg. 27). The Council advocates that in advancing the goals of sustainable development, the development of policy tools which meet the following criteria:

❑ *Provide greater regulatory flexibility with accountability*-- increased flexibility combined with compliance assurance can promote innovative and enhanced environmental protection at lower costs to individual entities and society as a whole;

❑ *Extend responsibility for environmental effects of products throughout life cycles* -- this responsibility should be adopted by designers, producers, suppliers, users, and disposers;

❑ *Make greater use of market forces to influence behavior* of firms, governments and individuals (e.g. emissions trading, deposit/refund systems, and tax and subsidy reform);

❑ *Use intergovernmental partnerships* to assure broad public involvement in place-based strategies that integrate economic development, environmental quality, and social policy making;

❑ *Encourage innovative development and use of environmental technologies* that will create jobs while reducing health and environmental risks.

Chapter V. Sustainable Development and the Civil Works Program

"…American society has been having increasing difficulty reaching agreement about societal goals. This is especially true for those issues that lie within the overlapping shadows of Americans' hopes for economic progress, environmental protection, and social equity" (PCSD).

The PCSD report and other writings on sustainable development emphasize that economic prosperity, a healthy environment, and social well-being and equity are interrelated components which cannot be optimally addressed in isolation. The Council states that public policies must attempt to integrate each of these areas, and that systematic consideration of the consequences of current actions for future generations is needed. This chapter discusses the Civil Works program in concert with the integration of these sustainable development components. It provides examples of how the consideration of the components of sustainable development are integrated within the Civil Works program, illustrating that working in this manner should not be foreign to the Corps. The material in this chapter includes:

➢ A general assessment of the Civil Works program to provoke thinking about the current and potential emphasis on the various components of sustainable development within Civil Works programs and activities.

➢ Discussion on several topics to illustrate incorporation of the principles of sustainable development into the Civil Works program; these topics include: watershed planning and management, the Corps' Regulatory program, using strategic frameworks to guide regulatory decisions, and frameworks for federal water resources planning.

➢ A summary relating the PCSD policy recommendations to Civil Works programs and activities which are discussed in more detail in Appendix B.

➢ Conceptual alternatives illustrating how sustainable development could specifically be addressed within the Civil Works program.

General Assessment of the Current Civil Works Program. The Corps is currently engaged in activities that support a large number of the policy recommendations of the PCSD, and as such is contributing to some of the sustainable development goals. The PCSD recommendations and actions that are most closely related to the Civil Works program are presented in Appendix B. Examples of ongoing programs and activities that relate to these recommendations are also provided. Examination of these programs and activities along with consideration of other aspects of the Civil Works program results in an assessment of the Civil Works program which may be illustrated as in Box 9. This graphic is intended to help illustrate a general perception of the current areas of emphasis within the Civil Works program with regard to the sustainable development goals and components described by the PCSD. In this view, the Corps is neither driven by sustainable development principles, nor is it oblivious to them; more emphasis is placed on economic than the other elements of sustainable development. This illustration is not intended to be a definitive representation of the Corps position with regard to sustainable development. The exact position of the Civil Works program along the continuum for any given factor may vary by project or activity and with the perception of the rater. This illustration is merely provided to evoke discussion about the current and potential distribution of emphasis on the various elements of sustainable development within Civil Works programs and activities.

Box 9. Civil Works involvement in and response to sustainable development represented along several continua:

OVERALL:
Sustainable Development (SD) Oblivious <----------XXXXXXXXXXX----------> SD Driven

OUTPUTS:
National Economic Development:
NED Oblivious <----------XXXXXXXX-----> NED Driven

Environmental Quality: EQ Oblivious <----------XXXXXXXXXXX---------> EQ Driven

Other Social Effects and Regional Economic Development:
OSE/RED Oblivious <----------XXXXXXXXX----------> OSE/RED Driven

Watershed Planning and Management. The need to conceive and implement water resources management via holistic and integrated approaches is integral to fostering the goals of sustainable development. Many of the prominent fora associated with sustainable development emphasize the critical roles that water resources development, use, and management play in sustainable development, and the need for a holistic view in both developing and managing these resources. The report from the Dublin Conference stated that ... *effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer. ... The most appropriate geographical entity for the planning and management of water resources is the river basin...*"(Dublin Principles, 1992, in United Nations Development Programme 1994; pg 39). The same conference also highlighted a number of concerns that are particularly relevant to the problem solving experience and capabilities in the Civil Works water resources program. The most relevant are summarized in Box 10.

Box 10. Concerns from Dublin Principles Relevant to Water Resources Development within the Civil Works Program (Dublin Principles, 1992, in United Nations Development Programme 1994; pg 41).

- Protecting Aquatic Ecosystems: "Integrated management of river basins provides the opportunity to safeguard aquatic ecosystems and make their benefits available to society on a sustainable basis."
- Water Conservation and Reuse: "Current patterns of water use involve excessive waste. There is great scope for water savings in agriculture, in industry, and in domestic water supplies."
- Water Constraints on Urban Growth: "The sustainability of urban growth is threatened by curtailment of the copious supplies of cheap water, as a result of the depletion and degradation caused by past profligacy."
- Resolving Water Conflicts: " ...The essential function of existing ... basin organizations is one of reconciling and harmonizing the interests of riparian [communities], monitoring water quantity and quality, development of concerted action programmes, exchange of information, and enforcing agreements. ... A high priority should ...be given to the preparation and implementation of integrated management plans, endorsed by all affected governments."

Many aspects of sustainable development can be addressed within a watershed-based approach to water resource development and management. Watersheds and river basins provide a hierarchical hydrologic/geographic system in which programs can be designed to manage the nation's water resources for desired mixes of regional economic, environmental and social objectives. Watershed-based approaches to water resources planning and management are familiar to the Corps, especially in the areas of navigation and flood control. For example, reservoir system operation studies are being undertaken for the Missouri, Columbia, and the Alabama-Coosa-Tallapoosa/Chatahoochi-Flint river basins in response to changing customer and stakeholder needs and evolving Corps missions. In recent years watershed-based approaches have received growing attention with respect to the Corps' expanding environmental mission. Shabman (1993, IWR Report 93-PS-1) contends that, for the Corps, *a watershed perspective is central to defining environmental problems and opportunities*, and *to developing program strategies and project designs that will assure the successful implementation of ... environmental projects* (pg. 21).

The evolving policies for Corps involvement in watershed planning initiatives emphasize a comprehensive view of water and related land resources problems and opportunities, including objectives that address both economic development and environmental restoration and protection objectives. The Corps' *watershed perspective* described in Policy Guidance Letter No.61, "Watershed Perspective for the Civil Works Program", recognizes that the complexity and interrelation of systems and water resources issues within a watershed requires regional collaboration in addressing issues that transcend jurisdictional boundaries. The principles outlined in the policy can help advance the goals of sustainable development by encouraging pursuit of a better understanding of the consequences of actions and activities, and mechanisms for sound decision making in addressing watershed resource needs, opportunities, conflicts, and trade-offs. Box 11 summarizes the principles outlined in the Corp's watershed perspective.

Box 11. Principles from the Civil Works Watershed Perspective.

- Water resources development, management and protection in a manner that takes into account environmental protection, economic development, and social well-being;
- Collaborative efforts which advocate the integration of interests and coordination of efforts in the watershed.
- Consideration of not only current but future water resource use demands.
- An analytical framework founded on factual scientific, social, and economic information, allowing for the assessment, evaluation, and comparison of alternative plans, including positive and negative effects on economic development, the environment, and social well-being.
- Evaluation and consideration of the monetary and non-monetary trade-offs.
- Interagency cooperation and cost-shared collaboration.
- Involvement of public and private groups to identify and achieve common goals and to help unify on-going efforts and leverage resources.

A watershed-based approach provides the opportunity for the Corps to integrate its separate Civil Works programs, including traditional programs such as planning, project operations and maintenance, and regulatory, as well as newer programs such as ecosystem restoration. Shabman (1993) points out that *a watershed perspective on environmental activities provides a basis for establishing the linkage among the Corps construction, operations, and regulatory programs* (pg. xi). He recommends that: 1) the Corps *more clearly define its current 'linkage requirement' to emphasize Corps project relationship to watershed features*

and processes (pg. xi); and 2) *emphasize a watershed scale in developing guidelines for environmental planning and evaluation and in its training of agency personnel* (pg. xi).

Riverine Ecosystem Restoration and Flood Hazard Mitigation Program. A recent legislative proposal (H.R. 1480) would include a Riverine Ecosystem Restoration and Flood Hazard Mitigation Program (sometimes referred to as "Challenge 21") as part of the Civil Works program. This program would meld some economic and environmental objectives and in doing so, should support some of the goals of sustainable development. The program is intended to accomplish both reduction of flood hazards and ecosystem restoration, and it emphasizes the use of non-structural alternatives. Eligible projects would need to present cost-effective measures that prevent flood damage, restore functions and values to watershed ecosystems and have strong local support. Partnership with other federal agencies (e.g. the EPA, FEMA, the Departments of Interior and Agriculture) will also be key to the proposed initiatives. The program would be implemented at the request of local communities, over 50 of which have expressed interest in participating in the proposed program.

The Corps' Regulatory Program. The Corps' Regulatory Program supports sustainable development both through its contributions to watershed management, and the public interest review which is integral to decision making for permit actions. It is not always recognized that the Corps' Regulatory program helps shape the way in which the nation's waters, including wetlands, are managed and developed. This is largely through its regulation of private sector growth and development in ecologically sensitive areas - the Nation's floodplains, wetlands and waterways. A large part of this program consists of regulating the nation's waters for navigation and water quality (e.g., Section 10 and Section 404 authorities). As such, the Regulatory program necessarily plays an important role in regional water resources planning and management. To this end, *there is both a need and opportunity to more fully coordinate regulatory and planning activities* (Shabman, 1993). Such an integration could also potentially advance the goals of sustainable development through providing assistance in helping to find environmentally sustainable solutions to problems related to water resources development and management.

The Corps' involvement in regulating certain activities in the nation's waters dates back to 1898. While the original focus of the Regulatory program was on the protection of navigation, legislation and judicial decisions have resulted in the program evolving to include the *consideration of broader public interests*. The decisions regarding issuance of individual permits are based on evaluations of the probable impacts of the proposed activity and its intended use on the public interest. Evaluation of the probable impacts of the proposed activity requires a careful weighing of all those factors which are relevant in each particular case. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments.

The Corps' general policies for evaluating permit applications are intended to provide a balanced evaluation of all of the potential benefits and anticipated adverse impacts across a wide range of evaluation factors. Benefits and detriments are balanced by considering effects on items such as those listed in 33 C.F.R. Section 320.4. These include: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

The provisions for this public interest review seem consistent with the sustainable development philosophy of considering the economic, environmental and social effects of proposed actions. However,

while the opportunity exists to consider these proposed effects in a balanced manner, the regulatory public interest review contains no detailed evaluation guidelines for applying information about the public interest review factors. In addition, there are no aggregation or tradeoff guidelines (Shabman, 1993). This analysis is conducted intuitively, utilizing best professional judgement in conjunction with comments from the public, environmental groups and federal, state and local agencies on a case-by-case basis. The public interest review process would best serve the purposes of sustainable development if conducted within a broader geographical context (e.g., within a watershed plan), than on a site-by-site basis.

The practice of issuing individual, "piecemeal" permits has been criticized as being inefficient and ineffective with respect to both regional development and environmental interests. In response, the direction of the 404 program has been changing from site-specific piecemeal permit evaluation to comprehensive, integrated wetlands regulation. This new approach includes the use of several tools, including: a) general permitting -- nationwide permits, regional permits, and programmatic permits (33 CFR parts 320-330); b) special area management plans (SAMPs); c) advanced identification of wetlands (ADID); and d) wetland mitigation banking (WMB). WMB is a flexible, market-based regulatory tool available to assist in the protection and management of aquatic ecosystems. (See also PR 2.7 and PR 4.2 in Appendix B). The Corps encourages support of watershed management goals through its Regulatory program. To facilitate this support, efforts are under way to examine various avenues for regulatory participation in watershed-based planning studies for wetland and aquatic resources protection, along with the impediments, problems, and potential improvements to the Corps' Regulatory program (IWR Report, *Watershed Study Impediments: Field Regulatory Survey Discussion Paper*, December 1997).

> Evaluations of permit applications are intended to provide a balanced analysis of the potential benefits and anticipated adverse impacts of proposed actions across a wide range of evaluation factors. The provisions for this "public interest review " complement the sustainable development philosophy of considering the economic, environmental and social effects of proposed actions.

Using Strategic Frameworks to Guide Regulatory Decisions. The elements, principles, and objectives of sustainable development as presented by the PCSD are so broad and intertwined, acting at many different levels of society, that it would be very difficult, if impossible to develop a comprehensive set of operating guidelines that could be uniformly applied to all levels of decision making. Indeed, while most of the principles can apply to individuals as well as governments, many of the proposed actions are, best suited for local governments. It makes sense to view sustainable development within the context of other principles of governance, i.e., that certain problems are best solved by levels of government that are constitutionally allotted those responsibilities and which are closest to the problems. Notwithstanding that premise, there is a role for federal agencies to provide an integrated and consistent framework for within which related resource management problems can be addressed in a uniform manner, with each agency and level of government exercising their respective decision making and implementation obligations.

> Many of the higher-order principles needed to foster sustainable development may be most appropriately incorporated into the higher, strategic levels of planning and management embodied in such evolving frameworks as ecosystem management, watershed management, river basin planning, regional land use management or coastal zone management.

Carrying out many of the objectives and actions recommended by the PCSD may depend on the nature of the planning and decisionmaking (strategic or tactical) and the level of management (national, regional, local or site specific). Consideration should be given to whether

a new rational integrated framework for sustainable development can be constructed for uniform decision making among all agencies or whether the principles for sustainable development should be selectively integrated within existing frameworks.

Many existing agency evaluation frameworks have specific guidelines, rules and decision criteria to guide decision making for specific actions or projects. Most such frameworks are regulatory in nature, with very detailed rules and criteria derived from law, scientific technical criteria, and court decisions. It is more difficult to adapt site-specific, project-specific regulatory guidelines to the more general principles of sustainable development, primarily because the regulations are largely based on prescriptive requirements of law, while the sustainable development principles are vary broad. Instead, it may be most appropriate to incorporate many of the higher-order principles needed to foster sustainable development into alternative strategies, pathways and plans, at the higher, strategic levels of planning and management, embodied in such evolving frameworks as ecosystem management, watershed management, river basin planning, regional land use management. Regulatory decisions then could be made against a background of competing resources management tradeoffs that have already been negotiated to a large extent through the higher order public planning processes which have identified compatible ensembles of actions and individual projects.

Frameworks for Federal Water Resources Planning. The planning process and system of accounts provided by the P&G can be used in support of sustainable development goals. The P&G is one of a handful of organized planning frameworks which integrates the principles of economic benefit-cost theory, social choice theory and decision theory into a cohesive and consistent set of principles and practical procedures that can help to analyze projects for their respective contribution to the goals of sustainable development, in an socially equitable manner. However, as noted earlier in this report, much of the recent application has tended to treat national economic benefits as a sole objective, and reduced the rigor of analysis of alternatives that produce benefits in other areas. Nevertheless, while all alternatives are evaluated against their contributions to national economic development (as per the P&G) and environmental quality (as per NEPA), the specific options are formulated or devised to meet local planning objectives which are statements of needs, values and preferences for future resources management. As such they represent the collective expressions of public values, equity and notions of sustainable development. Even though the contemporary application of the P&G framework has focused on the identification of national economic benefits, the planning process can be applied to other objectives, including those with multiple types of outputs. The system of accounts provided by the P&G can be used to facilitate *identification* of competing demands and identification of key tradeoffs. In particular, the process can show how well each alternative meets the local planning objectives as well as the higher level National and federal objectives. Plans must by definition be acceptable to the local sponsors as well as maximizing both federal environmental and economic objectives.

While recent application of the P&G has tended to treat national economic benefits as a sole objective, and reduced the rigor of analysis of alternatives that produce benefits in other areas, the system of accounts provided by the P&G can useful in identifying competing demands and key tradeoffs, and in helping to operationalize the principles of sustainable development.

The system of information accounts provided in the Principles and Standards (P&S) (Water Resources Council, 1973) should be useful for displaying information about objectives and tradeoffs, and useful in supporting the sustainable development goals in water resources planning, development and management. A similar framework exists within the Coastal Zone Management Guidelines. Furthermore, the idea of displaying information about various categories of effects is consistent with what is currently

allowed in the P&G. It is often emphasized or presumed that, according to the P&G, the NED plan must be selected unless an exception is granted by the department secretary or agency head, and that the NED account is the only required account. However, the P&G also states that *other information that is required by law or that will have a material bearing on the decision-making process should be included in the other accounts ... or in some other appropriate format used to organize information on effects* (pg. 8, 1.7.1(b)).[14]

Using the system of accounts from the P&S and the P&G as a model, four categories of information could be used to present the beneficial and adverse effects of each alternative. These accounts could include: NED; EQ; regional development; and social well-being (SWB) or other social effects (OSE). It is likely that a range of benefits and impacts will be contained within any set of alternative plans. There are also likely to be instances where the impact of an alternative on a given category of considerations cannot be easily labeled as either beneficial or adverse. This is likely because individual perceptions vary. When this occurs, it may be appropriate to display both the beneficial and adverse views, in the interest of fully informing the decision process.

Inasmuch as environmental documentation (EIA/EIS) is typically part of the evaluation, that documentation should be part of the public decision-making process, allowing the environmental impacts of each alternative are displayed and compared. The EIS can be used as a substitute information framework for the EQ account of the P&G, or one can rely on the Environmental Quality Evaluation Procedures (EQEP) of the P&G.

> An inclusive set of information on effects and tradeoffs can help provide a better understanding of both the intended and unintended consequences of the decisions. While difficulties in making tradeoffs persist, the increased availability of the information can help reduce uninformed decision making. Displaying the categories of information could help advance the goals of sustainable development.

The categories of information accounts would provide a framework for systematic investigation of the full range and extent of effects of a plan, in the level of detail suited for the effort. This approach could be applied not only in water resources planning, but in other Civil Works programs and activities as well. The information display could be prepared in a manner such that the different levels of achievement for each category could be readily discerned and compared, and so that consideration of tradeoffs between alternative plans could be facilitated. Limitations could be specified to ensure that efforts to develop information for the categories are balanced with respect to the overall study effort. That is, the level of detail in the information displayed would be consistent with the level and scope of the overall effort.

The *intent* of displaying information in these categories would not necessarily be to balance the four accounts, but *to improve transparency of the public decision making process*. Balance may or may not be desirable or possible depending on the planning context. The PCSD emphasizes that the three elements of sustainable development (economic prosperity, environmental health, and, social well-being and equity) are interrelated and that efforts to advance one may be to the detriment of one or both of the others. In certain instances, greater effort may be required in one of the areas. The availability of an inclusive set of information on effects and tradeoffs however, can help provide a better understanding of both the intended and unintended consequences of the decisions. In this light, displaying the categories of information could help advance the

[14] Such information may include, for example, provisions to comply with environmental laws such as the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA), or other information useful in evaluating the effects on the EQ account. However, better evaluation tools are needed to fully analyze multiple types of outputs.

goals of sustainable development. While difficulties in making tradeoffs persist, the increased availability of the information can help reduce uninformed decision making.

The realities of current planning studies, with the emphasis on "project delivery", warrant the caution that development of the categories of information described above should only be initiated if there is a genuine intent to use this information in decision making. In instances where a plan or parts of a plan have, for all practical purposes been "selected", a systematic investigation of the full range and extent of effects and implications of the action on multiple objectives would be an unnecessary cost, and at odds with the concept of sustainable development. In such instances it may be best to acknowledge the stage of the project and subject it to refinement through "value engineering," rather than development and evaluation of alternatives.

> The usefulness of information displayed in the categories of accounts is enhanced when the alternatives are developed in the context of a regional approach (watershed, ecosystem, river basin), rather than for a project at a particular site.

In whatever approach the Corps takes to address the sustainable development goals, there should be consideration of how and to what extent other federal agencies are pursuing the same ends. This is necessary for the federal government, as a whole, in order to achieve an overall balance of the three elements. Depending on the results of the PCSD implementation efforts, sustainable development could be "macro-managed" at the federal level, with different agencies focusing on different sustainable development elements, and the Corps continuing to focus on economic areas. Alternatively, sustainable development could be "micro-managed" within agencies, with each agency addressing all three elements.

Currently, the Corps' approach to planning is based on the P&G, as issued in 1983. However, as evident by the Council's report, the present Administration is investigating ways in which the concept of sustainable development might shape the operating paradigm for federal agencies. While the Clinton Administration has, to date, made no formal response to the report, it is possible that the federal objective in the P&G (with its primary emphasis of contributing to national economic development) may need to be reconciled with sustainable development in order to provide a clear direction for the Corps' role in supporting the goals of sustainable development. Until this is done, it may be confusing as to how the Corps should continue to apply the decision criteria of the P&G yet also address the goals of sustainable development. In fact (as of 1999) the Corps itself is undertaking a review of the evaluation criterion within the P&G, i.e. maximization of net economic benefits criterion, in light of the many "mixed" environmental restoration projects that it is planning and managing, as well as the growing watershed planning program with its eclectic mix of outputs.

Similarly, the pragmatic management emphasis on reducing study schedules and study costs as a means of improving performance may conflict with the emphasis on public involvement and consensus decision making, which are processes identified as important to advancing sustainable development. The development and use of innovative approaches to problem solving for multiple objectives demands less routine procedures which also may take more time to develop, at least in the beginning. This, too, can conflict with the emphasis on "quicker", "cheaper" studies and project delivery.

PCSD Recommendations Relevant to the Civil Works Program. The PCSD report identified a number of policy recommendations (see Table 1, in Chapter III), many of which are applicable to the Corps in that they are closely related to or affected by the Civil Works program. The Council's report also provides recommended "actions" for implementing the policy recommendations. Those policy recommendations and

the associated actions which are most relevant to the Corps' Civil Works missions and activities are discussed in Appendix B, along with some of the Corps' Civil Works activities that contribute to these recommendations and actions. Below is a summary of the material which is discussed in more detail the appendix.

PCSD Recommendations Topics Discussed:

- ➤ Reuse & Recycling
- ➤ Partnerships, Collaboration and Integration
- ➤ Tools for Resolving Conflicts
- ➤ Improving Risk Assessment and Benefit Cost Analysis
- ➤ Product Life-cycle Responsibility
- ➤ Community Drive Strategic Planning
- ➤ Efficient Use of Energy & Other Resources & Preservation of Cultural & Historic Values in Bldg. Design & Rehabilitation
- ➤ Brownfield Site Redevelopment
- ➤ Sustaining Ecosystem Integrity
- ➤ Leadership in International Efforts

Responsibility for environmental effects throughout a product's life cycle; include those involved in the life cycle...[designers, suppliers, manufacturers, distributors, users and disposers]. The PCS recommends that the federal government adopt practices and policies that can carry out extended product responsibility, and that Federal procurement policies reflect preferences for cost-effective, environmentally superior and recyclable/recycled products. The Corps' Civil Works program, through procurement, contracting, and other administrative activities, may have opportunities to include specifications for environmentally "friendly" materials, waste reduction, and recycling. Opportunities also may exist to utilize new environmentally compatible technologies and practices at a lower costs as part of the Corps construction contracts. Additionally, the Corps' research facilities may be able advance the scientific knowledge and technology needed to promote efficiency in the use of natural resources and address zero-waste. (See PR 2.3 in Appendix B).

Cost-effective reuse and recycling of materials. Recycling of materials such as paper, glass, plastics, and metals are already taking place in many Corps facilities, with some being implemented at the building or facility level. There may also be opportunities to expand existing recycling or reuse efforts. (See PR 2.6 in Appendix B).

Create intergovernmental partnerships to pursue economic prosperity, environmental protection, and social equity in an integrated way; shift from centralized, federally focused decision-making to collaboration and shared responsibility among all levels of government; move away from separate air, water, and land regulatory programs. Partnerships and collaboration are essential components of Civil Works involvement in new programmatic areas and approaches involving ecosystem management, watershed planning and management, floodplain management, and wetlands protection/restoration. Examples of partnerships developed through the Regulatory program include: the interagency guidance on wetland mitigation banking, working with states to assume oversight of the 404 permit process, and programmatic general permits which increase participation of state, local and tribal governments, as well as the public, in wetlands protection. The Corps also participates in numerous multi-agency partnerships which are working to address local and regional multi-objective challenges; e.g. Gulf of Mexico hypoxia, the Coastal America Partnership, American Heritage Rivers initiatives, the Brown fields Cleanup and Redevelopment Initiative, efforts in support of the Coastal Wetlands Preservation Protection and Restoration Act, and the Clean Water

Action Plan. The Challenge Partnerships Program, provides opportunities for non-Federal public and private groups and individuals to contribute to and participate in the operation and/or management of recreation facilities and natural resources at Corps operated projects. (See PR 2.7, PR 5.1 and PR 5.2 in Appendix B).

Tools for working within intergovernmental partnerships and resolving conflicts. The Corps has extensive experience with conflict resolution and has identified and developed approaches such as shared vision modeling and alternative dispute resolution which can both assist in trade off analysis and resolving conflicts. The Corps has also been instrumental in developing techniques for maximizing the effectiveness of public involvement, and published documents on related topics, e.g. *Public Involvement Techniques: A Reader of Ten Years of Experience a the Institute for Water Resources,* ICR Report 96-R-29: *Identifying Small Group Techniques for Planning Environmental Projects,* ICR Report 96-R-29*;* and, *Handbook for the Large Group Response Exercise,* ICR Report 98-R-4. (Also see PR 5.1 in Appendix B).

Better science for improved decision making; improve risk assessment and benefit cost-analysis. The Corps is developing analytical techniques which allow better incorporation and quantification of environmental costs and benefits; e.g., cost effectiveness and incremental cost analysis techniques (e.g. IWR Report #95-R-1, *Evaluation of Environmental Investments Procedures Manual, Interim: Cost Effectiveness and Incremental Cost Analyses*). Through its Risk Analysis Research Program, the Corps is developing and adapting techniques to improve risk analysis associated with the variety of issues and problems faced in water resources planning, engineering, designing, and operations (e.g. IWR report #96-R-8, *Risk and Uncertainty in the Evaluation of Environmental Investments*, IWR Report 97-R-7, *Risk and Uncertainty Analysis Procedures for the Evaluation of Environmental Output,* IWR Report 92-R-1 *Guidelines for Risk and Uncertainty Analysis in Water Resources Planning,*). A number of research and development efforts are also underway to develop better decision support tools. (See PR 3.2 in Appendix B).

Create community-driven, strategic planning, involving stakeholders in issue identification, vision development, goal and benchmark setting; encourage collaboration that transcends jurisdictions. The Corps is frequently in contact with local sponsors, communities and the general public as part of water resources planning, the Regulatory program, and natural resources and recreation management. Through these contacts, the Corps may be able to provide technical engineering, and ecological and economic information and analysis, as well as gain insights to local and regional goals and objectives. The Corps can provide planning assistance to states, including assistance in watershed and ecosystem management planning, and cooperate with states in preparing comprehensive state or regional plans to conserve coastal resources. Additionally, specifically authorized watershed studies address water resources problems and opportunities in a manner that is comprehensive and integrative. The Corps can assist in seeking out interests, in addition to the sponsor, to cost-share in collaborative, integrated initiatives which are multi-purpose, multi-objective and which involve cooperation and collaboration of federal, state and local agencies. (See PR 4.1 and 4.2 in Appendix B).

Building design and rehabilitation to use energy and natural resources efficiently, enhance public health and the environment, preserve historic and natural settings. The Corps owns and operates many facilities nationwide, including buildings, infrastructure, and land, and employs design and maintenance professionals, such as structural engineers, landscape architects, and grounds/building maintenance workers. Opportunities may exist to develop and incorporate "sustainable" design, construction and maintenance practices into current procedures. The Corps also has cultural resources professionals and is authorized to restore, reconstruct, rehabilitate, preserve, and maintain historic and prehistoric sites and buildings, objects, and property of national historical or archaeological significance as part response to damage resulting to historic buildings and/or sites from implementation of Corps projects. The Corps' Mandatory Center of Expertise

(MCX) for Curation and Management of Archaeological Collections assists with Corps curation needs and assists with compliance with the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA), (See PR 4.3 in Appendix B).

Redevelopment of Brownfield sites through regulatory flexibility, reducing process barriers, and assessing greenfield development to reflect necessary infrastructure costs. The Corps may be able to contribute to Brownfields revitalization when site assessment and clean up are integral to solving water resources problems related to Civil Works water resources mission areas and existing authorities. When the evaluation of a viable ecosystem restoration or flood damage reduction alternative requires a preliminary Brownfield assessment or cleanup, the assessment or cleanup costs required to make the project functional may be cost shared according to the project purpose. There may also be opportunities to participate on a reimbursable basis as Support for Others. (See PR 4.9 in Appendix B).

Ecosystem integrity - enhance, restore and sustain the health, productivity, and biodiversity of ecosystems through cooperative efforts. Corps policy on ecosystem restoration has moved from emphasis on fish and wildlife habitat and individual species, to a broadened focus on restoring ecosystem structure and function, and the need for greater sensitivity to broader landscape considerations. The Regulatory program now incorporates a greater emphasis on an ecosystem context for regulatory decisions and compensatory mitigation planning. Corps policy on environmental stewardship for Civil Works operated projects advocates that natural resources management activities apply ecosystem management principles, along with providing quality public outdoor recreation experiences to serve the needs of present and future generations (USACE, ER 1130-2-540, Chapter 2, p 2-1). Some of the relevant areas of responsibility include reforestation, soil conservation, sustainable yield management, riparian buffer development and habitat management for "special status" species. Recent authorizations include numerous provisions that integrate environmental considerations into new and existing projects, providing opportunity to foster the integrated consideration of environmental, economic and social objectives associated with water resources development and management. The development and use of ecological indicators is one area in which the Corps could work collaboratively with other federal agencies. Such efforts could advance the capabilities to evaluate current ecological conditions, assess responses to restoration or management measures, and to evaluate environmental program performance. (See also PRs 5.1, 5.2, 5.3, 5.5, 5.7, 5.8 in Appendix B).

Leadership in cooperative international efforts to encourage democracy, support scientific research, and enhance economic development that preserves the environment and protects human health. The Corps participates in a number of international initiatives through which it is incorporating or has the potential to provide scientific and other types of technical assistance, and help address the complex issues associated with economic development, environmental health and social well-being and equity that are inherent to each particular initiative. Examples of such international initiatives include the Great Lakes Water Level Management Initiative, the Great Lakes Water Quality and Ecosystem Charter, Devils Lake, the Red River of the North, and other efforts working with the International Joint Commission and Environment Canada. The Corps has assisted in the development of shared vision, along with workable and practical basin-wide strategies and projects that will address real issues affecting the communities and governments involved. In these and other efforts, the Corps is assisting in basin management planning with sustainable development as a goal. This assistance may also be provided to the Ivory Coast and the Nile Basin states in the future. Other opportunities to provide leadership in sustainability exist through the Support for Others (SFO) Program and the Permanent International Association of Navigation Congresses (PIANC). Through the SFO program, the Corps assists governmental (non-DOD) and other entities by providing quality engineering, environmental, construction management and related services; the office is also the liaison for international activities. As a member of PIANC, the Corps serves on a number of its committees and chairs the Permanent Environmental

Commission (PEC). The formation of the PEC was intended to signal endorsement of a leadership role in adopting an environmentally balanced approach to navigation infrastructure development and maintenance. The Declaration of its 1994 Congress on Navigation and the Environment summarizes PIANC's environmental mission, and states that PIANC *will fully support the principles of sustainable development and actively promote a holistic approach to managing environmental issues that manifest themselves in regard to waterways development, operations and management*. (See PR 7.1 in Appendix B).

Conceptual Alternatives for Integrating Sustainable Development into the Civil Works Program.

Alternatives for integrating sustainable development into the Civil Works program can be characterized by different degrees of emphasis on factors which influence program management and execution. These factors include: *management philosophy, authorities and mission areas, business practices,* and the application and development of *tools and technologies*. Examples of different actions which might be taken depending upon the degree of emphasis desired or required are provided below in terms of "low, moderate, and high" emphasis. These examples are not mutually exclusive or all inclusive, rather they are intended to generate thought and discussion about sustainable development in relation to the Corps programs and activities. Even without a specific charge by the Administration to address the recommendations in the PCSD report, there are a number of alternative ways in which the Corps could incorporate the concepts of sustainable development into Civil Works programs and activities.

Low degree of emphasis.

Management philosophy: Defer formal consideration of sustainable development. *****

A*uthorties and mission areas:* No change in mission or authorities.

Business practices: Implement changes in as driven by external forces and individual situations (e.g. Congressional adds and political pressures).

Application and development of tools and technologies: Continue to use existing tools and technologies. Only share experiences and teach current tools and approaches, do not pursue improvements.

***** Even if the Corps chose to ignore the concept of sustainable development, a number of existing requirements and factors will continue to require the Corps to consider economic, environmental and social aspects of its actions (see discussion in Chapter IV). In addition, the Corps will continue to pursue activities which, by default, contribute to the goals of sustainable development. As discussed earlier in this Chapter, and illustrated in Appendix B, a number of Civil Works programs and efforts (e.g. ecosystem restoration, natural resource management stewardship) already address some aspects of a number of the PCSD policy recommendations and overarching goals. However, certain status-quo Corps activities potentially act at cross purposes to sustainable development. For example, it is often difficult to justify flood damage protection for low income neighborhoods relative to wealthy ones. Also, there may be instances where, without proper planning, project implementation, operation and regulatory decisions could work at cross purposes, or at least the decisions may not be consistent from one program to another.

Moderate degree of emphasis.

Management philosophy: Identify ongoing efforts that contribute to the goals of sustainable development. Or, adopt sustainable development implicitly as a precept or value - incorporate sustainable development into Civil Works business practices as more of a value such as "safety" or "diversity", where consideration of whether an alternative or an action is "sustainable" would be more implicit, rather than explicit. Incorporation of sustainable practices would be based on an evolutionary development of concepts and practices, recognizing a high degree of overlap of implications among not only initiatives pertaining to ecosystem management and watershed management, but program management decisions in general.

Authorties and mission areas: Contribute to the goals of sustainable development solely within current authorities and current programs. Refocus current missions and business practices toward sustainable development goals and activities. Emphasize those areas which the Administration has identified as priority for Civil Works involvement, remaining focused on water and related land resources. Implement PCSD policy recommendations as they seem most applicable to the current Civil Works water resources program.

Business practices: Focus would continue to be on economic development, or a combination of economic development and environmental outputs. Consider environmental and equity issues, along with economics, as part of Civil Works studies and projects, allowing trade-offs but emphasizing primarily economic considerations and monetary outputs. Develop sensitivity or awareness training regarding the range of potential impacts Civil Works programs and activities can have on sustainable development. Make sustainable development awareness training available and mandatory for all personnel. Treat sustainable development considerations in a manner similar to "value engineering" of plans and designs.

Application and development of tools and technologies: Conduct research and development to improve: a) the description and measurement of outputs from efforts with multiple categories of objectives; b) capabilities and tools for trade-off analysis; c) presentation of information so that decisions about trade-offs can be made; and, d) capabilities to develop and apply shared vision planning processes.

High degree of emphasis.

Management philosophy: Support problem solving frameworks which encourage more complete solutions such as such as plans for integrated implementation measures, rather than emphasis on Corps project construction. Account for benefits and costs at scales of neighborhood, city, metropolitan area, county, state, nation, and globe. Extend time horizons to include intergenerational effects. Require post-completion audits to assess whether decisions made produced the desired sustainable results. Develop a sustainable development office within the Corps to foster and promote thinking and actions that are consistent with and advance the goals of sustainable development. Emphasize extensive coordination of activities as standard practice. Emphasize greater examination of cumulative effects and unintended effects of decisions and recommendations.

A*uthorties and mission areas:* Expand mission areas beyond traditional water resources to enable the Corps to more aggressively address environmental and social equity issues (moving to watershed issues or even to issues only marginally related to water). Broaden missions through executive directive, legislation and interpretation of existing authorities. Seek additional authority in order to change policies or pursue initiatives that would allow formulation for environmental and social as well as economic objectives. A new authority might address combined objectives such as urban infrastructure improvements, wetland restoration for both environmental and flood damage reduction objectives, and planning and regulatory programs that

could limit urban sprawl. Identify areas in which the Corps has the expertise which (with or without current authority) to advance the goals of sustainable development - not limited to water resources development and management.

Business practices: Include more rigorous examination of tradeoffs among economic prosperity, environmental vitality, and social welfare as part of project planning and evaluation. Use co-equal (or appropriately weighted) accounts for NED, EQ, RED and OSE/SWB. Instill close working relationships among the planning, design, construction, operations, and regulatory programs of the Corps to meet agency performance goals in support of sustainable development. Foster greater integration of CW efforts with other federal agencies and with state and local jurisdictions. Examine ways to modify the "public interest review" undertaken as part of permit application review within the Regulatory program, to better accommodate sustainable development goals.

Application and development of tools and technologies: Develop performance goals and develop and test indicators for sustainable development within the Civil Works program. Develop tools to improve ability to assess the effects of decisions on broader spatial and temporal scales, and consideration of cumulative impacts. Also see discussion under low an medium levels of emphasis.

Summary.

Over the course of its long history in water resources development and management, the Corps has been responsive to the contemporary societal demands of the times. Civil Works authorities and programs have progressively developed as a result of Administration and Congressional requirements and priorities over the years, and they continue to evolve. Since 1986, there has been an increasing demand for a new mix of environmentally sensitive outputs from water resources projects. This is notably demonstrated in the Water Resources Development Act of 1996, PL 104-303, (WRDA 96) directives to conduct studies which address combinations of objectives such as flood damage reduction and ecosystem restoration, as well as projects that address objectives that have been traditionally considered more local in responsibility. Consideration is given to environmental and social issues as part of Civil Works decision making, as many of the issues that arise pertain to these factors. There is also increased recognition of the stewardship responsibilities for the resources developed and managed by federal agencies, including those under the Civil Works programs. Even if the Corps should pursue a less aggressive approach to sustainable development, the evolution of, and pressure for incorporating this philosophy as part of project evaluation is likely to increase. As mentioned earlier, the question is not whether mankind will engineer its environment, but how it will do so -- and thus, what principles will guide future decisions.

Chapter VI. Findings and Conclusions

... to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations... (NEPA, 42 U.S.C. 4331).

Findings. These findings are presented to help highlight the significant points discussed in this report.

- The principal tenet of the PCSD report is that social, economic and environmental problems are intertwined and must be considered together, and that institutions and individuals must adopt a new way of thinking that inextricably links these issue areas. The PCSD emphasizes a need to shift from single-minded advocacy to action that ensures progress in all three areas of economics, environmental health and social equity.

- Many authors note that sustainable development cannot be reached directly, but only approximately and indirectly, through a sustained period of confronting and resolving the conflicts between the various goal areas.

- The PCSD acknowledged that while the report outlines 38 major policy recommendations and over 1,500 ways to achieve them, only about 25% of the recommended actions apply to the federal government, with the remaining 75% to be implemented by other levels of government, business, communities and individual citizens.

- The policy statement contained in NEPA encompasses the philosophy of sustainable development, and thus could be viewed as a foundation policy on sustainable development for federal agencies Unfortunately, since most of the emphasis of NEPA implementing guidance has been on procedural requirements, the core elements of the philosophy behind the policy are often neglected

- Strong parallels may be drawn between the four accounts of the P&G and P&S (NED, EQ, RED/RD, OSE/SWB), and the three elements of sustainable development (economic efficiency and prosperity, environmental protection, and social well-being and equity). This connection suggests that the P&G framework can provide a foundation for an analytic basis for addressing issues of sustainability as part of Civil Works water resources planning and development.

- The Corps has focused primarily on the economic objective (through economic development) -- until recently when objectives related to ecosystem restoration were elevated as a programmatic priority. Nonetheless, environmental and social concerns are not ignored in Civil Works project development. The authorization and appropriation processes through which Corps projects must pass, an integrated public involvement processes, sound engineering judgment, and environmental impact assessment incorporate social, local, and environmental objectives. Thus, while sustainable development has not been an explicit criterion in Corps decision making, the planning and evaluation process (including NEPA analysis), together with the process for project approval and public involvement, contain many of the elements of a structured approach to dealing with sustainable development.

- In spite of the strengths of the P&G and NEPA frameworks, other factors challenge the Civil Works program to conduct business in a manner that fosters sustainable development. The emphasis on

"projects" rather than "problem solving which takes into account the contexts for and trade-off implications of alternatives" may result in investments that do not support sustainable development goals. However, the goal interdependencies and implications may well be addressed through the political process at the Administration or Congressional levels during authorization.

- The Corps' general policies for evaluating permit applications are intended to provide a balanced evaluation of all of the potential benefits and anticipated adverse impacts across a wide range of evaluation factors. The provisions for this "public interest review" compliment the sustainable development philosophy of considering the economic, environmental, and social effects of proposed actions. Some of these reviews are done at the programmatic level when nationwide or general permits are developed, rather than for individual actions.

- Because of the integral relationship between the Nation's economic prosperity and a healthy, natural resources base, there is growing recognition that increased rates of habitat destruction, fragmentation, and land use conversions have led to substantial losses of biodiversity and extinction of species, which in turn have led to losses of ecosystem structure and functions important to society.

- Ecosystem management has been described as managing nature to achieve a particular state or condition, and it has been emphasized that this is different from managing nature to produce goods and services. However, as humans are part of the ecosystem, these goals (i.e. managing to achieve a particular condition and to produce goods and services) need not be mutually exclusive. Sustainable development concepts suggest striving to achieve a state or condition that would provide for goods and services while acknowledging that there are limitations to both the ecological resources and the goods and services provided.

- The Corps has the ability, the opportunity, and in many cases, the obligation to support environmental health and sustainability, especially in the protection and restoration of aquatic ecosystems. However, the environmental aspects of sustainable development are broader than the environmental quality account as the Corps currently views it. The Corps will be challenged to incorporate more comprehensive environmental concepts, such as biodiversity and ecosystem integrity into the planning and analysis process, as well as in the operation of its projects.

- The renewed emphasis on watershed planning and management provides opportunities to apply problem solving approaches which address water and related resources problems in a manner which integrates environmental, economic and social objectives. Such approaches, when combined with interagency and intergovernmental collaboration can foster the goals of sustainable development.

- Within the Civil Works program, the application of the "watershed perspective" (per PGL 61), multi-objective planning, the public interest review applied in the Regulatory program, and the integration of natural resources management into the management of operating projects all provide opportunities to support the PCSD recommendations.

- The P&G is one of a handful of organized planning frameworks which integrates the principles of economic benefit-cost theory, social choice theory and decision theory into a cohesive set of principles and practical procedures. It provides a substantive framework which can be useful in analyzing projects for their respective contribution to the goals of sustainable development. However, there is a sense that while the planning framework of the P&G affords this type of analysis, current implementation involves a reduced rigor of analysis in accounts other than NED for most Civil Works

projects. Similarly, the formulation of ecosystem restoration projects may not always include analysis of the implications of a recommended alternative on economic and social considerations.

- Cost-sharing has served to incorporate non-federal interests and local values into the planning for projects, however, increased sponsor roles in decision making also influences the comprehensiveness of the formulation and evaluation done for a project. Simply speaking, if the sponsor is interested in a particular project, rather than development of alternatives through a comprehensive approach to water resources problem solving, then the study is likely to short circuit to "fine tuning" of an already identified alternative which may not have been developed in a manner that sufficiently takes into account consequences that do not foster sustainable development.

- Increased pressures to reduce study schedules and costs may challenge abilities to: pursue collaborative approaches; assure meaningful public and stakeholder involvement; and examine the alternative implications of proposed projects on factors that influence sustainable development goals. Public involvement and consensus decision making are processes identified as important to advancing sustainable development. Minimizing study schedules should not necessarily be incompatible with application of the P&G and NEPA frameworks. However, there is evidence that the emphasis on quick project delivery may be resulting in disregard for alternatives development and analysis, along with short circuiting of stakeholder involvement and trade-off analysis. Such omissions may also be a result of a diminishing pool of experienced planning capabilities and associated appreciation for when extensive analysis and comprehensive approaches are necessary.

Conclusions.

While the vagueness in the definition of sustainable development allows for coalition formation based on support of broad sustainability goals, it also impedes the ability to quantify and operationalize sustainability for project or other detailed analyses. As debates over sustainable development issues continue, more substantive public policy objectives may be identified. In the water resources management field, the underlying issues and respective notions of sustainable development and its implementation are prevalent, and many of the ideas and terminology associated with sustainable development are derived from water resources literature and policy pronouncements. The Corps, along with other federal agencies ought to be actively involved in better defining and supporting the goals of sustainable development.

Evaluation frameworks familiar to the Corps may well serve the Civil Works program in advancing the goals of sustainable development. It should be possible to advance the goals of sustainable development through greater integration of NEPA within study planning, and a broader application of the system of accounts of the P&G and P&S. The NEPA process provides information about the implications of alternatives under consideration and avenues for public and stakeholder involvement. The system of accounts devised in the P&S, and carried through to the present P&G was intended to encompass all significant effects of a plan on the human environment, as required by NEPA (Water Resources Council, 1980). The P&G provides a systematic analytical process for formulating, scaling, and evaluating alternatives. While the P&G framework has focused on economic objectives, the planning process of the P&G can be applied to address multiple objectives and to consider tradeoffs among the three elements of sustainable development. Information developed in response to NEPA, combined with that developed and evaluated using the P&G planning process, could be very useful in addressing many of the PCSD's goals, which offer little in the way of a measurement system or tangible targets, although they are working on indicators. The current P&G framework, as frequently used with the single NED objective, may not provide for sustainability. However, the use of the planning process and system of accounts for Civil Works projects may be closer to thinking

sustainably than approaches that do not formulate and evaluate alternatives against specified objectives and consideration of "future without action" conditions.

At the time that the P&G was developed, some argued that the multi-objective planning emphasized by the P&S had become too time consuming, complicated, and costly. However, some now suggest that the P&G is ill-suited for today's water resources planning needs because of its more narrowly focused objective. Despite the changes in emphasis on NED, the planning process and the four account framework remain robust and resilient, and useful in planning which can foster the goals of sustainable development particularly when closely tied to information derived from the NEPA process.

A number of factors may potentially impede Civil Works support of sustainable development. There is an increasing tendency to disregard alternatives development and analysis and to short circuit stakeholder involvement and trade-off analysis in the interest of tightening project schedules and costs. Also, study sponsors, who pay 50% of the study costs, play a major role in scoping projects and may not be interested in developing alternatives through a comprehensive and collaborative approach and examining the implications of various alternatives. As Civil Works program execution and other strategies are developed, it would seem essential that consideration be given to the implications of various approaches and recommendations on National sustainable development goals.

While sustainable development is becoming a central concept in thinking about development and the environment, the clarity of its meaning diminishes in the move to implement the concept. There is no implementation guidance on how to achieve sustainable development. Rather, the concept may be most useful by reminding people of the complexity which exists in decisions about resource use. The PCSD report does not tell us how to balance the three objectives, nor how to actually achieve sustainable development. The relationships among the goals of environmental protection, economic growth, and social equity are represented by both conflicts and dependencies. Sustainable development has been offered as a holistic concept for dealing with these conflicts. In reality, sustainable development cannot be reached directly, but only approximately and indirectly, through a sustained period of confronting, and trying to understand and resolve the conflicts among the three elements of the goal. Sustainable development requires consideration of interdependencies and long term consequences of proposed actions into decision making, and reinforces the need to improve abilities to present information on tradeoffs, as well as the use of this information in decision making.

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The PCSD's greatest hope has always been that its report would launch a national dialogue about how best to achieve sustainablity. To grow and endure, the sustainability movement's ideas must be tested and challenged. Only through such testing will the best ways of achieving our goals be developed. (Molly Harriss Olson, Executive Director, PCSD; in *Environment,* vol 38, no. 5, June 1996.)

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Appendix A
PCSD Policy Recommendations in Relation to Sustainable Development Goals

Policy Recommendation	PCSD National Sustainable Development Goals									
	1 Health & the Environment	2 Economic Prosperity	3 Equity	4 Conservation of Nature	5 Stewardship	6 Sustainable Communities	7 Civic Engagement	8 Population	9 International Responsibility	10 Education
2.1 Regulatory Cost-Effectiveness	X	X		X	X		X			X
2.2 Perform. Based Management System	X	X			X		X		X	
2.3 Extended Product Responsibility	X		X	X	X	X			X	
2.4 Shift in Tax Policies	X	X	X	X	X	X	X	X	X	X
2.5 Subsidy Reform	X	X	X	X	X	X	X	X	X	
2.6 Market Incentives	X	X	X	X	X		X	X	X	
2.7 Intergovernmental Partnerships	X	X	X	X	X	X	X	X	X	X
3.1 Better Information Management	X	X	X	X	X	X	X		X	X
3.2 Better Science for Decision Making	X	X		X				X	X	X
3.3 Improved Access to Information	X	X	X	X	X	X	X	X	X	X
3.4 Info for Sustainable Living	X	X	X	X	X	X	X	X	X	X
3.5 Indicators of Progress	X	X	X	X			X			
3.6 Supplemental Nat. Income Accounts	X			X			X		X	
3.7 Environmental Accounting	X			X			X		X	
3.8 Formal Education Reform	X	X			X		X			X
3.9 Non-formal Education & Outreach	X		X		X	X	X	X		X
3.10 Education for Sustainability	X	X	X	X	X	X	X	X	X	X
4.1 Community Driven Strategic Planning	X	X	X		X	X	X			
4.2 Collaborative Regional Planning	X	X	X	X	X		X			
4.3 Building Design & Rehabilitation	X	X			X	X				
4.4 Community Design	X	X	X		X	X				
4.5 Community Growth Management	X	X	X	X	X	X	X	X		
4.6 Create Diversified Local Economies		X				X				
4.7 Training & Lifelong Learning		X	X			X				X

Policy Recommendation	PCSD National Sustainable Development Goals									
	1 Health & the Environment	**2 Economic Prosperity**	**3 Equity**	**4 Conservation of Nature**	**5 Stewardship**	**6 Sustainable Communities**	**7 Civic Engagement**	**8 Population**	**9 International Responsibility**	**10 Education**
4.8 Environmental Economic Development	X	X		X	X					
4.9 Redevelopment of Brownfields Sites	X	X	X		X					
5.1 Collaborative Approaches	X	X	X	X	X	X	X	X	X	X
5.2 Ecosystem Integrity	X	X		X	X					
5.3 Incentives for Stewardship	X	X		X	X			X	X	
5.4 Agricultural Resources Management	X	X			X					
5.5 Forest Management Goals	X	X		X	X					
5.6 Restoration of Fisheries	X	X			X				X	
5.7 Natural Resources Information	X	X	X	X	X		X		X	X
5.8 Biodiversity Conservation	X	X	X	X	X	X	X	X	X	X
6.1 Family Planning/Access & Services	X	X	X		X	X		X	X	X
6.2 Opportunities for Woman	X	X	X		X	X		X		
6.3 Improved Immigration Policies	X	X	X		X	X	X	X	X	
7.1 International Leadership	X	X	X	X	X			X	X	X

Appendix B
PCSD Recommendations Relevant to the Civil Works Program

The report of the President's Council on Sustainable Development (PCSD), *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future* (1996), identified a number of policy recommendations (see Table 1 in main body of this policy study report). A number of these recommendations are applicable to the Corps in that they are closely related to or affected by the Civil Works program. The Council's report also provides recommended "actions" for implementing the policy recommendations. Those policy recommendations and the associated actions which are most relevant to the Corps' Civil Works missions and activities are discussed in this appendix. Some of the Corps Civil Works activities that contribute to these recommendations and actions are identified and briefly discussed, along with additional opportunities which are offered for consideration.

Each policy recommendation is numbered with a "PR" number. The first part of the number refers to the chapter in the PCSD report where the recommendation appears. The second part of the number (after the decimal point) refers to the number of the recommendation within the chapter. Action number refers to the particular implementing action that is thought to be relevant to the Civil Works program. The discussions and suggestions that follow in the "response" sections are not intended to represent the comprehensive applicability to the Civil Works program, but rather to spark ideas on contributions to and relevancy of the Civil Works program to the goals of sustainable development.

PR 2.1: Increased Cost-effectiveness of the Existing Regulatory System. *Accelerate efforts to evaluate existing regulations and to create opportunities for attaining environmental goals at lower economic costs.*

Action points: Agencies should develop regulatory approaches that are: a) more cost-effective (action 1), and b) performance-based with respect to national standards (action 2).

Response: Executive Order 12866, "Regulatory Planning and Review" (30 September 1993) applies to all federal agencies with regulatory missions, including the Corps, and serves as a broad umbrella for addressing issues of regulatory efficiency, effectiveness, and flexibility. Executive Order 12866 parallels this PR and provides a basis for federal agencies to develop cost-effective environmental regulations. The Executive Order is supported by guidance provided by the Office of Management and Budget, "Economic Analysis of Federal Regulations Under Executive Order 12866," ("Best Practices") (OMB, 1996).

The Corps has taken action to address past inefficiencies and inflexibilities within its regulatory program (see also PR 2.2 for regulatory performance measures). In the Section 404 wetlands regulations, for example, the Corps is moving away from issuing permits in a piecemeal way and toward comprehensive wetland management. Available tools for streamlining and increasing the flexibility of the regulatory process, especially at regional scales, include: Section 404 general permits (33 CFR parts 330); advanced identification of disposal sites (ADID) (which includes characterization of aquatic

resources); special area management plans (SAMPs); and wetland mitigation banking. Federal guidance for wetland mitigation banking is provided in the Federal Register, 28 November 1995.

Environmental regulatory reform has also been a focus of legislative discussions, and reform measures have been introduced as stand-alone bills and attached to other bills. These proposed legislative measures have been addressed in two USACE IWR Emerging Issues Discussion Notes, Numbers 10 (1995) and 11 (1996), which address the implications of risk analysis and regulatory reform legislation for the Corps.

PR 2.2: Alternative Performance-based Management System. *Create a bold new alternative environmental management system designed to achieve superior environmental protection and economic development that relies on verifiable and enforceable performance-based standards and provides increased operational flexibility through a collaborative decision-making process.*

Action points*:* This PR extends PR 2.1 by suggesting that: a) state and federal regulatory agencies work with private sector to develop flexible means for achieving environmental protection, and performance standards, for meeting environmental protection goals (actions 1 and 2); and b) national labs and federal research agencies should help develop the scientific basis of technologies and practices which support a "zero waste" society (action 4).

Response: As one of several federal agency pilot programs for the Government Performance and Results Act of 1993 (GPRA), the Corps developed a set of performance measures for its O&M program. These measures were determined through an interactive group process, and four categories of the measures were developed to address environmental areas (see the Corps' National Operation and Maintenance Program "Performance Measurement Guidebook", August 1995). Efforts were initiated to expanded to develop GPRA performance measures for the nine "business areas" within the Civil Works program, including environmental and regulatory business areas. Draft goals and performance measures have been issued for each of these business areas. One or more quantitative measures have been developed for assessing whether or not each of these goals is being achieved on a year-to-year basis . (See also PR 3.5, "indicators of progress.")

The draft environmental protection goals from the Corps effort are to: 1) comply with federal, state, and local environmental laws and regulations; 2) ensure that mitigation outputs satisfy legislative or administrative requirements; 3) assist in the recovery of Federally listed species; and 4) make positive contributions to the nation's environmental resource base. Attainment of the first goal will be measured by the percent of major and significant findings that have been corrected. The second goal will be measured by the percent of mitigation lands which meet mitigation requirements, as stated. The third goal will be measured by the percent of species for which the Corps is accomplishing ascribed recovery plans. The fourth goal will be measured by acres of new land and aquatic habitat established as a result of authorized mitigation and restoration activities.

The goals of the Corps Regulatory program are to administer the Regulatory program in a manner that: 1) renders fair and reasonable decisions for applicants; 2) protects the aquatic environment; and, 3) provides for efficient decision making.

PR 2.3: Extended Product Responsibility. *Adopt a voluntary system that ensures responsibility for the environmental effects throughout a product's life cycle by those involved in the life cycle...[designers, suppliers, manufacturers, distributors, users and disposers]*

Action points: The federal government should voluntarily adopt practices and policies that can carry out extended product responsibility on a regional and national scale. Federal procurement policies should reflect preferences for cost-effective, environmentally superior and recyclable/recycled products (action 3).

Response: Collectively, government agencies are the nation's largest consumers and can put market pressure on manufacturers to increase the life-cycle efficiency and environmental-friendliness of products and services (PCSD, 1996, pg.38). The Corps' Civil Works program, through procurement, contracting, and other administrative activities, may have an opportunity to address this issue. Efforts can include procurement specifications for environmentally "friendly" materials, waste reduction, and recycling.

In terms of supporting a "zero waste" society, the Corps' research facilities may be able to contribute to the scientific knowledge and technology needed to promote efficiency in the use of natural resources and address zero-waste in this broader sense. There also may be opportunities to evaluate new technologies and practices for attaining environmental goals at a lower costs as part of the Corps construction contracts.

PR 2.5: Subsidy Reform. *Eliminate government subsidies that encourage activities inconsistent with economic, environmental, and social goals.*

Action points*:* Eliminating or phasing-out subsidies may result in short-term dislocations but would provide long-term benefits for the nation as a whole. A commission should be formed to determine whether existing subsidies are compatible with sustainable development, and determine ways to mitigate the short-term effects of removing subsidies (action 1).

Response: Corps projects that provide services such as flood control, navigation, flood plain utilization, water supply, and/or provision of recreation have historically provided implicit subsidies for project users and other beneficiaries based on the relative distribution of costs and benefits of these projects. Some of the subsidized activities may be inconsistent with sustainable development goals. For example, the existence of Corps flood control and flood damage reduction projects may encourage additional development of flood plains and increase risk and damages due to flooding (see the Galloway Report, 1994, pg. v).

During project planning, it may be possible to evaluate the likely magnitude and distribution of explicit or implicit subsidies, and whether or not subsidies provide incentives for activities that are inconsistent with sustainable development goals. In some instances it may be necessary to explore legislative modifications to financing, cost sharing, and cost recovery. Still, from a programmatic perspective, administrative action can sometimes be used to offset the effects of subsidies or the incentives to take advantage of it, e.g., through regulatory requirements which run counter to the subsidy.

Among the recent legislative proposals for the Civil Works program is a Flood Hazard Mitigation and Riverine Ecosystem Restoration Program (sometimes referred to as "Challenge 21"), which is intended to restore riverine ecosystems and reduce flood hazards and flood disaster recovery costs primarily by expanding the use of non-structural alternatives. Eligible projects would need to present cost-effective measures that prevent flood damage, restore functions and values to watershed ecosystems and have strong local support. Partnership with other federal agencies (e.g. the EPA, FEMA, the Departments of Interior and Agriculture) will also be key to the proposed initiatives.

PR 2.6: Use of Market Incentives. *Make greater use of market incentives as part of an overall environmental management system to achieve environmental and natural resource management objectives, whenever feasible. This system must provide for verification, accountability, and the means to ensure that national standards are met or exceeded.*

Action points: The federal government should build on existing programs that allow the buying and selling of emissions reductions in order to reduce the costs of meeting air and water quality standards (action 1). The federal government should work with others to identify cost-effective ways to reuse and recycle materials (action 2).

Response: While the Corps is not involved in emission permit trading, environmental quality issues can be addressed in part through wetland mitigation banking, which is a flexible, market-based regulatory tool that is part of the Corps' Section 404 program. Mitigation banking allows off-site and possibly out-of-kind replacement of wetland functions and values that are lost at a development site. Regulatory guidance on wetland mitigation banking has been published in the Federal Register (28 November 1995), and banking is discussed in USACE IWR Emerging Issues Discussion Note Number 6 (1994) and in a number of IWR reports (e.g. Reppert, 1992; USACE and Environmental Law Institute, 1994; Shabman et al., 1994; Brumbaugh and Reppert, 1994; Apogee Research, Inc., 1994; Environmental Law Institute, 1994; Scodari and Shabman, 1995; White and Shabman, 1995).

In response to action point 2, all areas of the Corps can participate in recycling materials such as paper, glass, plastics, and metals. Such efforts can be implemented at the building or facility level, and are already taking place in many Corps facilities. There may also be opportunities to expand existing recycling/reuse efforts involving used vehicles, office furniture and equipment, etc.

PR 2.7: Intergovernmental Partnerships. *Create intergovernmental partnerships to pursue economic prosperity, environmental protection, and social equity in an integrated way.*

Action points: This recommendation suggests that federal agencies: develop partnerships with state governments to administer environmental regulatory programs (eliminate duplication and unnecessary federal oversight); and form partnerships with communities that wish to carry out local SD plans. Agencies should: shift from centralized, federally focused decision-making to collaboration and shared responsibility among all levels of government; and move away from separate air, water, and land regulatory programs to comprehensive, integrated place-based programs that are consistent with national interests (actions 1 through 3).

Response: This recommendation has broad implications for many of the Corps Civil Works programs, including Regulatory, Planning, and O&M activities. Partnerships and collaboration are seen

as essential components in new programmatic areas, such as ecosystem management, watershed planning, and wetlands protection/restoration. For example, wetland mitigation banking guidance published in the Federal Register resulted from a cooperative effort among the Environmental Protection Agency (EPA), Natural Resource Conservation Service (NRCS), Fish and Wildlife Service (FWS), and the Corps.

Also under the Section 404 wetlands regulatory program, states have the opportunity to assume oversight of the 404 permit process, although to date only two states (Michigan and New Jersey) have adopted this authority. Other states have declined, citing as reasons "the complex process of assumption, the anticipated cost of running the program, and the continued involvement of federal agencies" (Zinn and Copeland, 1996, pg. 6). A report by the White House Office on Environmental Policy, "Protecting America's Wetlands: A Fair, Flexible, and Effective Approach" (1993), calls on Congress to provide funding to help states assume the 404 program. This report also recommends that partial assumption of the program by states be authorized as an interim step toward full assumption. Partial assumption would allow states time to work with the Corps and EPA in developing wetlands regulatory expertise.

Another mechanism for the Corps to develop partnerships with the states, as well as tribes and local agencies, is the development of programmatic general permits (PGP). These are general permits, issued by the Corps, to other licensing agencies that regulate some or all of the activities regulated by the Corps. The Corps must first judge that these agencies protect the environment and the public interest and provide for public involvement to an acceptable level. Upon issuance of the PGP, Corps authorization is conveyed at the same time as the agency's license. PGPs are envisioned in the Clinton Administration's Wetlands Plan as a method for increasing participation of state, local and tribal governments, as well as the public, in wetlands protection.

Many federal agencies are also working together to develop common statements of ecosystem management objectives and common indicators of ecosystem health and quality. See, for example, the Ecological Stewardship Workshop Report (1995) and the Interagency Ecosystem Management Task Force Reports, Volumes I-III (1995). See also PR 5.1 and PR 5.2. The Corps is currently involved or has opportunities to participate in numerous partnership arrangements. Examples of multi-agency partnerships where the Corps is using its expertise to address local and regional challenges include the addressing hypoxia in the Gulf of Mexico, the Coastal America Partnership, American Heritage Rivers initiatives, the Brownfields Cleanup and Redevelopment Initiative, efforts in support of the Coastal Wetlands Preservation Protection and Restoration Act, and the Clean Water Action Plan. The Challenge Partnerships Program, as authorized by Section 225 of the WRDA 1992, provides opportunities for non-federal public and private groups and individuals to contribute to and participate in the operation and/or management of recreation facilities and natural resources at Corps water resources projects.

Cost-sharing partnerships between the Corps and non-federal sponsor(s) are legally required for most Corps projects by the cost sharing provisions of the Water Resources Development Act of 1986, as amended. Civil Works project planning typically involves multiple interests and multiple types of outputs, and facilitating inter-agency and non-federal involvement has become an important part of the planning process. As the need for intergovernmental partnerships has grown, the Corps has identified and developed methods to meet this need. Although not yet widespread, approaches used by the Corps, such as shared vision modeling and Alternative Dispute Resolution, can facilitate collaboration within joint planning efforts (see also PR 5.1, "collaborative approaches").

PR 3.1: Better Information Management. *Improve the collection, organization and dissemination of information to reduce duplication and streamline reporting requirements while giving decision makers information related to economic, environmental and equity goals.*

Action Points: The Council asserts that agencies need to review and modify how they collect, organize, and disseminate data on economic, environmental and social conditions and trends, in order to improve coordination among agencies and to better meet the needs of information users (action 1), and reduce the burden of duplicative reporting (action 3). Agency information system plans and programs are to be included in GPRA reports and performance measures for their information-gathering, processing and dissemination programs should be based on outcomes and products, as GPRA directs (action 2). The Council further suggests that agencies should contribute to comprehensive regional inventories of environmental, social and economic data (action 4).

Response: Some planning and technical assistance initiatives produce GISs and databases that are useful to the local sponsors and other beyond the study for which they were developed. The Corps could look for opportunities to contribute to or utilize databases which other agencies or organizations have developed or maintain (See Recommendation 5.7). Obstacles which may prevent the utilization of non-Corps data include proprietary rights and incompatible data formats and matters of scale. The issue should be raised that "better" information management and dissemination does not necessarily lead to better decision making if the information is presented in confusing formats or at the wrong level of detail. The Corps could increase their use of computer media by consistently posting information, reports and databases on the Internet and by using and contributing to GIS databases. Information developed in NEPA documents may also be made available electronically and potentially be made more accessible. See also PRs 2.2 and 5.7.

PR 3.2: Better Science for Improved Decision Making. *Strengthen the base of scientific knowledge and increase its use by decision makers and the general public.*

Action Points: Research is needed to improve the understanding of sustainablity issues such as relationships among human and natural systems, human health issues, emerging global problems and the loss of biodiversity (action 1). Results of scientific research should be disseminated in ways to help decision makers promote sustainable development (action 3). The Council further recommends that federal agencies support and encourage research to improve risk assessment and cost-benefit analysis, and enhance the use of these tools in policy making (action 4).

Response: A greater depth of scientific knowledge is needed in the areas of ecology, wildlife biology, species/habitat interactions, and wetland systems, to better understand cause and effect relationships and environmental system dynamics. Improved scientific understanding in these areas may be useful in the development of ecosystem management and restoration plans by helping to reduce areas of information uncertainty and focus management or restoration efforts on the most sensitive or imperiled systems. However, more science is not necessarily, in and of itself, a mechanism for *better* decision making, nor should science be used as the sole decision-making tool. The emphasis of this policy recommendation must be on the quality of scientific information, not the quantity. In response to action 4, the Corps is one of the few federal agencies which formally uses benefit-cost and cost effectiveness analyses is in decision making.

The Corps is developing analytical techniques which allow better incorporation and quantification of environmental costs and benefits; e.g., cost effectiveness and incremental cost analysis techniques. See the following EEIRP reports: IWR Report #95-R-1 and IWR Report #95-R-10. Further, the Principles and Guidelines (P&G), consistent with action 4, recognizes the importance and utility of risk assessment, and the Corps is developing better risk assessment tools. See, for example, EEIRP's report #96-R-8 on Risk and Uncertainty in the Evaluation of Environmental Investments. A number of research and development efforts are also underway to develop better decision support tools. It may be possible to evaluate these efforts to determine how their products can better support sustainable development goals.

The P&G acknowledges that uncertainty and variability are inherent in water resources planning and must be evaluated and considered in the formulation of alternative water resource management and development plans. Risk and uncertainty can be characterized through sensitivity analysis and probability studies, and are to be assessed and reported in a manner which allows this information to be utilized in the development of plans. Budget constraints, increased local cost sharing, and concern for cost effective performance and reliability reemphasize the need to explicitly consider risk and uncertainty in Corps planning, engineering and operations.

The Corps has several ongoing initiatives to improve capabilities for risk and uncertainty analysis in the Civil Works program. A Risk Analysis Research Program is developing and adapting techniques to to better analyze risk associated with the variety of issues and problems faced in water resources planning, engineering, designing, and operations. Examples of products include risk-based benefit-cost analysis for project rehabilitation; methods for qualifying structural reliabilities, and guidance and procedures for risk-based analysis in flood damage reduction studies.

Until recently, little guidance and few tools have been available for addressing the uncertainties inherent in ecosystem restoration studies. A number of research efforts have been initiated as part of the EEIRP to respond to the need for these tools. These efforts include: 1) a review of relevant sources for applications of risk and uncertainty concepts and methods to environmental evaluations; 2) identification of generic and specific sources of risk and uncertainty in environmental evaluations; 3) identification of potential tools and methods to address the risk and uncertainty issues; and 4) demonstration of approaches for incorporating risk and uncertainty into Corps environmental evaluations. Products completed include: 1) IWR Report 96-R-9, *Incorporating Risk and Uncertainty into Environmental Evaluation: An Annotated Bibliography,* (summarizes applicability of existing Corps guidance to environmental projects and includes a literature review on general risk and uncertainty assessment, management techniques, and examples environmental applications of risk analysis); 2) *An Introduction to Risk and Uncertainty in the Evaluation of Environmental Investment (*identifies sources of risk and uncertainty in environmental projects and identifies potential methods to address these sources of risk and uncertainty); and 3) *Procedures Manual: Approaches for Incorporating Risk and Uncertainty into Environmental Evaluation* (demonstrates how risk analysis tools can be used in formulating alternative plans, analyzing with and without project conditions, and comparing and selecting a plan).

PR 3.3: Improved Access to Information. *Adopt open information policies and practices...Adopt policies that increase access to public information for all segments of society and encourage the development of the National Information Infrastructure by the private sector in ways that improve access for all.*

Action points: The Council asserts that collaborative and flexible regulatory approaches require open processes to communicate baseline measurements and improvements in environmental performance. Improved reporting of and access to information can provide more accountability and can also assist in tracking and verifying performance and progress (action 1). Information on the environmental characteristics of products should be considered during procurement decisions (action 2). Agencies should encourage information standards and formats that are consistent so that the public and policy makers can effectively access information (action 3). Agencies should promote widespread access to sustainable development information via computers, computer skills training, and electronic information availability through the Internet (action 4).

Response: The Corps can work to improve consistent, timely access to high quality, clearly presented information for all interested and/or impacted parties. Efforts should continue to be made to facilitate public participation as early as possible in the planning process. Mechanisms to improve data access and dissemination include: electronic media, town meetings, news letters, press releases, and availability of NEPA documentation. The use and availability of Civil Works information on the world wide web is increasing, and efforts could also be made to improve access and use of electronic media by Corps personnel themselves. The databases and other information systems related to the Corps Regulatory program are evolving. Information currently available varies from district to district.

PR 3.4: Information for Sustainable Living. *Endorse and promote awareness of the economic, environmental, and social benefits of sustainable practices - such as more efficient resource use in government, the private sector, and the home - and encourage local governments, businesses, and community groups to engage people in making these improvements.*

Action points: The federal government should encourage and facilitate the creation of and access to information and data on sustainable development and sustainable living such as ways to use resources more efficiently.

Response: As part of its Civil Works planning studies, the Corps has opportunities to inform sponsors, stakeholders, decision makers and the interested public about the economic, environmental and social benefits of sustainable development. The Corps has considerable experience and capability to discuss the consideration of economic efficiency, in particular, but is also experienced and qualified to discuss and share information on the other two components.

PR 3.5: Indicators of Progress. *Develop indicators of progress toward national sustainable development goals and regularly report on these indicators to the public.*

Action points: The Council suggests that federal agencies contribute to interagency efforts to develop national indicators of sustainable development progress (action 1) and provide information in formats useful to other levels of government working to develop indicators (action 2).

Response: The Interagency Working Group on Sustainable Development Indicators was created to develop measures of progress towards national sustainable development in the U.S. Progress on a list of indicators can be found at http://www.sdi.gov. The Corps may have opportunities to contribute to this effort, as well as to utilize or modify the indicators which are developed for the national level to more appropriately suit the scale and activities of the Corps. See also PR 5.7.

PR 3.6: Supplemental National Income Accounts. *Establish a supplemental system of satellite national income accounts that provides integrated measures of the economy, the environment, and the natural resource base.*

Action points: Federal agencies should continue the development of methods for measuring the quantity and quality of renewable and nonrenewable resources. One component of these measures should be the economic value (costs and benefits) of degrading or restoring air, water, and soil quality (action 1).

Response: The Corps evaluates the economic value of proposed water resources projects as a matter of routine and has developed tools to address the cost effectiveness of proposed ecosystem restoration projects. The P&G guide the Corps' formulation and evaluation studies, and establish four accounts to facilitate evaluation and display of the effects of alternative plans. These four accounts encompass all significant effects of a plan on the human environment as required by NEPA. While the information in these accounts is project specific, the concept of the "system of accounts" upon which these current accounts are based may be useful in addressing this recommendation. Incorporating measurements of renewable and nonrenewable resources into the "system of accounts" within the P&G would facilitate a more comprehensive analysis which addresses sustainable development.

PR 4.1: Community-driven Strategic Planning. *Create a community-driven, strategic planning process that brings people together to identify key issues, develop a vision, set goals and benchmarks, and determine actions to improve their community.*

Action points: All levels of government (including federal agencies) and the private sector should build multi sector decision-making capacity at the local level by providing information and technical assistance to communities that wish to engage in collaborative processes to integrate economic prosperity, environmental health, and opportunity in their decisions and actions (action 1). They should also ensure opportunities for public participation in all phases of planning and decision making (action 2). In addition, federal agencies should assist communities that wish to use environmental risk profiles in identifying and setting priorities for solving environmental problems (action 5).

Response: As part of water resources planning, project operation and maintenance, and the Regulatory program, the Corps is frequently in contact with local sponsors and communities and thus is in a position to provide technical engineering, and ecological and economic information and analysis. Through the Section 22 Program (WRDA 74), the Corps has authority to provide planning assistance to states, including assistance in watershed and ecosystem management planning. Section 227(d) of WRDA 96 allows the Corps to cooperate with states in preparing comprehensive state or regional plans to conserve coastal resources. A number of specifically authorized watershed studies are currently underway which could support this recommendation. To promote the approach necessary for pursuing a comprehensive watershed study, the Corps should actively seek out the various interests that could cost-share in the collaborative initiative, rather than limiting the scope of the study to the interests of a single non-federal sponsor. An integrated approach through a watershed partnering process, accommodates the development of a watershed action plan which is multi-purpose, multi-objective and which involves cooperation and collaboration of federal, state and local agencies.

Electronic media, such as the Internet, provide a means for making information available to a wide audience. The Corps maintains a home page and a number of other sites on the Internet which provide access to many reports, documents, and other information about Civil Works programs, projects and activities. (See also PR 3.1, "better information management," and PR 3.3 "improved access to information").

As discussed above, the Corps also facilitates public and inter-governmental participation in planning and decision making. (See also PR 2.7, "intergovernmental partnerships", and PR 5.1, "collaborative approaches".) The Corps may also be able to assist in community planning strategies as part of Planning Assistance to States (Section 22, WRDA 1974).

Various initiatives lead by other agencies also may present opportunities for the Corps to contribute to community-driven strategic planning. For example, the Urban Resources Partnership (URP), is a program initiated by the Department of Housing and Urban Development and the Department of Agriculture in 1994. The URP encourages a "bottom-up" approach to environmental education and restoration in urban areas through involvement of local communities, federal and state agencies, not-for-profit organizations, local businesses, and foundations. URP initiatives have been implemented in a number of cities, launched by grants of $500,000 from USDA. Depending on circumstances, the Corps may be able to participate in URPs and similar programs through its various existing Civil Works authorities. Such efforts also afford potential access to people, agencies, and local initiatives that could help the Corps implement the Regulatory program more effectively.

The Corps is also identifying risk assessment methodologies that can be applied to ecosystem restoration projects as part of the Evaluation of Environmental Investments Research Program (EEIRP) (see EEIRP Report 96-R-8). General guidance for evaluating risk and uncertainty in the formulation of water resources management and development plans is provided in Supplement 1 of the P&G (Water Resources Council, 1983). This guidance can be used to develop risk profiles for water resources projects, which may be useful to communities undertaking risk-based environmental decision making.

PR 4.2: Collaborative Regional Planning. *Encourage communities in a region to work together to deal with issues that transcend jurisdictional and other boundaries.*

Action points: The federal government should work with others to ensure that economic and environmental data and other statistical resources are available for measuring benefits and costs (action 1). Agencies should support regional collaboration on issues such as transportation and water quality and, as appropriate, help establish regional planning and development initiatives (action 2).

Response: Watersheds provide the geographic context to promote both coordination among different functional areas of the Corps and collaboration with others. Such linkages may create opportunities for increased economic efficiency and improved ecological protection. Several areas of the Corps' Civil Works program may fall under this recommendation.

Many watershed studies have the potential to foster consensus and collaboration among stakeholders regarding future water resources use, management, regulation and development in a basin. Such initiatives not only provide the opportunity to develop shared future visions regarding water resources among multiple stakeholders, they also can be used to identify opportunities for collaboration

and leveraging of resources. The Corps' watershed perspective described in Policy Guidance Letter No.61, Watershed Perspective for the Civil Works Program, supports regional collaboration in addressing issues that transcend jurisdictional boundaries. Projects that are conceived as part of a watershed planning initiative or other regional resources management strategy are likely to more effectively meet regional goals than those projects and decisions developed independently. Many water resources development and management problems may only effectively be addressed through an integrated, collaborative, systematic, regional approach.

Wetlands regulation impacts regional water quality and ecosystem health and goals. Among the tools the Corps can apply toward integrating the wetlands regulatory program with collaborative regional planning are Special Area Management Plans (SAMPs), advanced identification (ADID) of disposal areas, and wetland mitigation banking (WMB). SAMPs are comprehensive plans providing for natural resource protection and economic growth in a specific geographic area, and are authorized by the Coastal Zone Management Act Amendments of 1980. SAMP development represents a joint effort between the Corps and a local sponsor, typically a state or local environmental/ natural resource agency (IWR Report 94-WMB-6, pg. 102-104). Advanced identification of disposal areas is a joint Corps/EPA effort to identify areas as suitable or unsuitable disposal (fill) sites prior to issuing individual wetland fill permits (IWR Report 94-WMB-6, pg. 101-102). The ADID classification also includes aquatic resources characterization, including mapping or identification of wetlands functions and wetland categorization. This information can be used by local communities to help them better understand the functions and values of the aquatic resources, especially wetlands. Wetland mitigation banking involves cooperation between the Corps and private bank developers who create new wetlands or enhance/restore degraded wetlands in order to generate "credits" which can be sold to offset authorized losses in wetland functions elsewhere (see also PR's 2.1 and 2.6).

In WRDA 96, a number of new provisions increase the opportunity for the Corps to participate in collaborative regional planning, including watershed planning and management. Section 221 of WRDA '96 allows the Corps to provide planning assistance to states by expanding eligible areas of planning assistance to include watershed and ecosystems. In addition, Section 227(d) authorizes the Corps to work with states in preparing comprehensive state or regional plans to conserve coastal resources. The Corps is involved in or has opportunities to participate in a number of partnerships which address regional objectives. See PR 2.7 for examples of multi-agency partnerships where the Corps is using its expertise to address regional challenges. Some Corps districts also participate in regional collaborative initiatives such as the Regional Implementation Teams of Coastal America, and the Southeast Natural Resources Leadership Group, Chesapeake Bay Agreement, Everglades Restoration.

PR 4.3: Building Design and Rehabilitation. *Design and rehabilitate buildings to use energy and natural resources efficiently, enhance public health and the environment, preserve historic and natural settings, and contribute to a sense of community identity.*

Action points: Government agencies should work with builders, architects, developers, contractors, materials producers, manufacturers, community groups and others to develop and enhance design tools that can improve the efficiency and liveability of buildings. Buildings and public facilities can be designed for improved efficiency and livability, and site landscaping can include native plants in order to reduce the need for fertilizers, pesticides, and water (action 1). Historic properties can be identified for preservation, rehabilitation, and new uses, as appropriate (action 3).

Response: Nationwide, the Corps owns and operates many facilities, including buildings, infrastructure, and land, and employs design and maintenance professionals, such as structural engineers, landscape architects, and grounds/building maintenance workers. The Corps also has cultural resources professionals. Opportunities may exist to develop and incorporate "sustainable" design and maintenance practices into current procedures. Opportunities include building design and construction efforts for Army and other DOD departments, as well as other federal agencies, and state and local governments under the Corps' Support for Others Program.

Federal agencies, including the Corps, are authorized to restore, reconstruct, rehabilitate, preserve, and maintain historic and prehistoric sites and buildings, objects, and property of national historical or archaeological significance. Such restoration activities may be undertaken in response to damage resulting to historic buildings and/or sites from implementation of Corps projects. Guidance for the Corps is provided in ER 1105-2-100 and ER 1130-2-540.

The Corps' Mandatory Center of Expertise (MCX) for Curation and Management of Archaeological Collections at St. Louis manages Corps-wide curation needs assessments and design services for the curation of archaeological collections. The MCX reviews the status of Corps-wide curation of collections and associated documents and ensures USACE compliance with the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA), Public Law 101-601, and 36 CFR Part 79 (Curation of Federally-Owned and Administered Archeological Collections).

PR 4.5: Community Growth anagement. *Manage the geographical growth of existing communities and siting of new ones to decrease sprawl, conserve open space, respect nature's carrying capacity, and provide protection from natural hazards.*

Action points: Government incentives and subsidies which encourage development in areas vulnerable to natural hazards should be eliminated (action 5).

Response: In order to address this recommendation, the Corps might initiate evaluations of its new and ongoing projects for compatibility with sustainable development principles. For example, the Corps' flood protection projects in flood plain, shore, and coastal areas may provide incentives for increased development of these areas and implicitly subsidize the true costs of reducing flood risk to flood plain occupants (see PR 2.5). This Recommendation may also be relevant to the issuance of Section 404 and Section 10 permits for the filling of wetlands (and navigable waters in general) within areas vulnerable to flooding or other natural hazards.

PR 4.9: Redevelopment of Brownfield Sites. *Revitalize brownfields - which are contaminated, abandoned, or under used land - by making them more attractive for redevelopment by providing regulatory flexibility, reducing process barriers, and assessing greenfield development to reflect necessary infrastructure costs.*

Action points: All levels of government should work in partnership with community residents, environmental organizations, community development corporations, industry and businesses to redevelop or stabilize brownfield sites by: (1) eliminating barriers to brownfields redevelopment; (2) creating incentives for environmental cleanup; and (3) by re-orienting existing state and federal economic development funding and programs to include these sites.

Response: In 1993, the EPA launched the Brownfields Initiative to empower states, communities, and other stakeholders to assess, clean up, and sustainably reuse brownfields, and to stimulate local economies by creating jobs. The Corps has not been authorized or funded to address Brownfield redevelopment needs. However, there may be opportunities for the Corps to contribute to Brownfields Cleanup and Redevelopment Initiative goals where assessment and clean up are integral to solving water resources problems related to Civil Works water resources mission areas and existing authorities. For example, if the evaluation of a viable ecosystem restoration or flood damage reduction alternative requires a preliminary Brownfield assessment, the assessment can be cost shared as part of the feasibility study. Also, if the recommended ecosystem restoration or flood damage reduction alternative requires cleanup of a Brownfield, the costs of cleanup required to make the project functional may be cost shared according to the project purpose. There may also be opportunities to participate on a reimbursable basis as Support for Others. Through such arrangements, the Corps may be able to bring a wide range of problem solving capabilities to the initiative, including: environmental assessment and cleanup, project management, development planning, economic and ecosystem analysis, and real estate services. The Corps also has extensive partnering experience with state and local governments and other stakeholders

PR 5.1: Collaborative Approaches. *Use voluntary, multi stakeholder, collaborative approaches to protect, restore, and monitor natural resources and to resolve natural resource conflicts.*

Action points: The Council asserts that the President should issue an executive order, directing federal agencies, under GPRA, to support this recommendation and develop collaborative approaches for the management of natural resources (action 1). In addition, the federal government should play a more active role in consensus building on difficult issues and identifying opportunities that would allow stakeholders to work together toward common goals (action 4).

Response: The Council suggests that an "ecosystem approach" to natural resources management provides an excellent framework for fostering and utilizing collaborative management approaches in achieving ecological goals.[1] The Corps' policy and guidance supports cooperative efforts with other agencies and stakeholders in meeting environmental restoration goals. Since ecosystems do not necessarily correspond to institutional, jurisdictional or ownership boundaries, collaborative approaches may promote the development of integrated plans, more consistent with the natural scale of ecosystems. Further, collaborative planning and management of natural resources may prove more economically viable through more efficient utilization of limited funds.

Senior Corps leaders are encouraging collaborative management approaches, especially in situations where cost sharing between agencies and non-federal partners can occur. Examples of partnerships between the Corps and other agencies are illustrated in Table B-1at the end of this appendix. Also see discussion of the "Challenge 21" proposal for restoring riparian ecosystems and reducing flood hazards and damage in PR 2.5. The Challenge Partnerships Program, as authorized by Section 225 of the WRDA 1992, provides opportunities for non-Federal public and private groups and individuals to contribute to and participate in the operation and/or management of natural resources and recreation

[1]An ecosystem approach is one which attempts to manage entire ecological systems, including all components and functions, rather than individual species or resources.

facilities at Corps water resources projects. These partnership agreements may be used for the identification, protection, improvement, rehabilitation, preservation, management, or interpretation of natural resources, environmental features, recreation areas and facilities, or cultural resources. Watershed studies also have the potential to build consensus and collaboration among stakeholders regarding future water resources use, management, regulation and development in a basin.

The Corps has extensive experience with conflict resolution and has identified and developed approaches such as shared vision modeling and alternative dispute resolution which can both assist in trade off analysis and resolving conflicts. The Corps has also been instrumental in developing techniques for maximizing the effectiveness of public involvement, and published documents on related topics, e.g. *Public Involvement and Dispute Resolution - A Reader on the Second Decade of Experience At the Institute for Water Resources,* IWR Report 98-R-5; *Identifying Small Group Techniques for Planning Environmental Projects*, IWR Report 96-R-29*;* and, *Handbook for the Large Group Response Exercise,* IWR Report 98-R-4.

PR 5.2: Ecosystem Integrity. *Enhance, restore and sustain the health, productivity, and biodiversity of terrestrial and aquatic ecosystems through cooperative efforts to use the best ecological, social, and economic information to manage natural resources*.

Action points: The Council supports ecosystem management with collaborative partnerships as a means of managing for ecological and ecosystem integrity (actions 1 and 5). Agencies should help facilitate ecosystem approaches by providing access to information, technical assistance, and funding and removing administrative obstacles (action 3). Further, the Council recommends that agencies develop ecological indicators to assess the condition of natural resources and monitor the impacts and success of management and restoration activities (action 4).

Response: There are a number of avenues through which the Corps can address this policy recommendation. The Corps' policy on ecosystem restoration incorporates a philosophy of moving from an emphasis on fish and wildlife habitat and individual species, to a broadened focus on restoring ecosystem structure and function. The guidance emphasizes the need for greater sensitivity to broader landscape considerations, i.e. activities on adjacent lands or that otherwise influence, or are influenced by, Corps projects. The guidance also outlines the authorities and processes through which the Corps can participate in ecosystem restoration initiatives.

In addition to studies and projects undertaken specifically for ecosystem restoration or protection, there are other Civil Works programs and activities that support this policy recommendation and action points. Through the Regulatory program, implemented in response to Section 404 of the Clean Water Act of 1977 (33 U.S.C. 1251, 1344), the Corps regulates activities in wetlands and other waters of the United States. The Regulatory program has evolved to include a greater sense of the ecosystem context for regulatory decisions and compensatory mitigation planning (U.S. Government, 1995). An example of this is the recently issued federal guidelines for wetland mitigation banking, which emphasizes that regulatory decisions consider implications on ecosystem integrity and that banks be developed to be consistent with broader watershed management planning initiatives.

Corps policy on environmental stewardship activities carried out at Civil Works projects is consistent with the general goals of sustainable development, as well as this particular policy

recommendation. Corps policy advocates that natural resources management activities be consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations (USACE, ER 1130-2-540, Chapter 2, p 2-1). Some of the relevant areas of responsibility include reforestation, soil conservation, sustainable yield management, riparian buffer development and habitat management for "special status" species.

WRDA 1996 includes numerous provisions that integrate environmental considerations into new and existing projects. These studies provide the opportunity to foster the integrated consideration of environmental, economic and social considerations associated with water resources development and management. Included are provisions for: environmental, habitat and wetland restoration; wildlife, habitat and wetland enhancement; restoration of estuarine ecosystem functions; and watershed and ecosystem management. A number of the provisions afford opportunities to demonstrate the use of the best ecological, social, and economic information to develop alternative plans and recommendations regarding water resources development and ecosystem restoration.

The development and use of ecological indicators is one area in which the Corps could work collaboratively with other federal agencies. Such efforts could advance the capabilities to evaluate current ecological conditions, assess responses to restoration or management measures, and to evaluate environmental program performance. The U.S. Forest Service co-sponsored an Ecological Stewardship Workshop, in December 1995, with a number of other federal agencies. The purpose of the workshop was to develop ecological indicators and a framework for the implementation of an ecosystem approach on federal lands and waters. The Corps was not able to participate in this workshop, and as such, may have missed some valuable opportunities for collaboration on ecosystem approaches. An Interagency Ecosystem Management Task Force published three reports that contain recommendations concerning ecosystem management on federal lands (IEMTF, 1995). The task force also produced a Memorandum of Understanding which outlines general policies through which signatory agencies can foster the ecosystem approach. The Office of the Assistant Secretary of the Army is included among the fourteen signatories. See also Recommendations 5.1, 3.1, and 3.3.

PR 5.3: Incentives for Stewardship. *Create and promote incentives to stimulate and support the appropriate involvement of corporations, property owners, resource users, and government at all levels in the individual and collective pursuit of stewardship of natural resources.*

Action points: The Council asserts that users of public resources should pay the full cost associated with the use of those resources, including market and nonmarket values (action 1). Further, when making decisions concerning public infrastructure projects, agencies should weigh the economic benefits of the project against the costs -- incorporating both market and non-market costs, such as net impacts on the ecological system (action 2). In addition, "[e]xisting projects should be reengineered to the extent possible to restore ecological functions and habitat, using cost-benefit analysis, including both market and nonmarket and ecological values" (action 2, pg 124). The Council suggests that well-developed market incentives, used in conjunction with an appropriate regulatory framework, can provide the most efficient approach to natural resource management, as well as contributing to development of stewardship and accountability.

Response: As part of the EEIRP, the Corps is conducting research to improve abilities to identify and incorporate non-market benefits and costs, in addition to market costs, into analysis and

decision making. See for example, EEIRP reports by Doll, et al (1994), Doll and Rubin (1995), and Feather, et al (1995). While some progress is being made, additional research and training are needed in this area. Cost-sharing initiatives, in which beneficiaries of a project pay a portion of the costs, help to promote the appropriate role of resource users. Most of the water resources development and ecosystem restoration initiatives require cost sharing with non-federal sponsors. Some may view cost sharing as a subsidy, rather than making the sponsor pay; when viewed as a subsidy, it could be considered an incentive to participate in stewardship initiatives. See also Recommendation 2.6.

PR 5.5: Achievement of Year 2000 Sustainable Forest Management Goal. *Establish a structured process involving a representative group of stakeholders to facilitate public and private efforts to define and achieve a national goal of sustainable management of forests by the year 2000*.

Action points: As an outgrowth of ideas from the Rio Earth Summit, President Clinton committed the nation to achievement of sustainable forest management on both public and private lands by the year 2000. The Council recommends that relevant agencies should support and promote efforts to achieve sustainable forest management, in part, through the development of criteria and indicators of sustainable forest management (action 1).

Response: The Corps manages nearly 12 million acres of land and water in conjunction with the projects that it operates and maintains as part of the Civil Works program. A portion of the land is forested. The Corps is already contributing to this recommendation through efforts conducted as part of natural resource management in the O&M program. These efforts include sustained forest yield programs, reforestation efforts and conservation practices, many of which are done in response to the Reservoir Areas-Forest Cover Act (1960). This Act requires the Corps to develop plans in reservoir areas which ensure adequate and dependable future resources of readily available timber through sustainable yield programs, reforestation and conservation practices. This recommendation may support continuation and expansion of such conservation, stewardship activities. Limited opportunities may also exist for the Corps to contribute to sustainable forest efforts through ecosystem restoration projects.

PR 5.6: Restoration of Fisheries. *Restore habitat and eliminate over fishing to rebuild and sustain depleted wild stocks of fish in U.S. waters.*

Action points: The Council recommends that agencies need to take actions to protect and restore aquatic ecosystems and riparian habitats, as well as to eliminate activities which degrade fisheries, including the introduction of exotic species (action 1).

Response: This recommendation complements Executive Order 12962 on Recreational Fisheries (1995), which stipulates that federal agencies should conserve, restore, and enhance aquatic systems to provide for increased recreational fishing. The Corps is the Department of the Army's and the Department of Defense's representative on the interagency task force to implement this order. The construction and operation of Corps locks, dams, and reservoirs, as well as its wetland regulatory policies, have the potential to impact migration routes, as well as spawning and nursery grounds of certain freshwater, marine and estuarine fish. Operating policies of a number of Corps' reservoirs have been modified to reflect fish life-cycle and habitat needs. A number of structural and operational modifications can and have been made at certain Corps dams to manipulate the physical system and enhance conditions for select aquatic species. These include: construction of special intake and outlet

structures, fish ladders and bypasses, selective withdrawals, special releases, aeration and low flow augmentation. The Corps may also have opportunities to contribute to this recommendation as part of ecosystem protection and restoration initiatives.

PR 5.7: Natural Resources Information. *Strengthen information on natural resources by integrating and building on existing international, federal, state and tribal natural resources and biodiversity inventories, assessments, and databases, and by developing and using compatible standards, methods and protocols.*

Action Points: Agencies should agree upon consistent data collection and reporting standards and methodologies (action 2). Further, agencies should establish accessible and useful data inventories (action 3) and participate in developing indicators of sustainability (action 4).

Response: The Corps may have opportunities to compile its own or contribute to other agencies' databases of environmental and natural resource conditions through environmental monitoring and adaptive management efforts. As part of natural resources management carried out under the O&M program, the Corps already maintains two types of natural resource inventories which contain information on the quality and quantity of natural resources on Corps-administered lands. The first level is a general inventory which includes plant/animal composition data, acreage of dominant vegetation, soil types, land use, presence of "special status" species and/or habitat (threatened, endangered or sensitive species). The second level of inventory involves more detailed assessments of characterization of habitat and populations of "special status" species. Other functional groups of the Corps might also be able to utilize this information and expertise in developing ecological restoration and mitigation plans.

Further, every Corps project requires information on environmental resources. Efforts could be made to seek out and make better use of existing environmental inventories and databases. The expertise of other natural resource management agencies and organizations and their respective databases and inventories may be very useful; e.g., EPA's Landscape Analysis and Assessment database, the U.S. Fish and Wildlife Service's National Wetlands Inventory, and the Environmental Monitoring and Assessment Program (EPA, 1993). The Nature Conservancy has a well developed database on biodiversity (a measure of the relative abundance and richness of species) that the Corps might be able to utilize in developing and/or prioritizing ecosystem restoration projects. The Nature Conservancy, in partnership with states, has developed a National Heritage Program and Conservation Data Centers, which maintain detailed information on the distribution and abundance of plant and animal species and ecosystems. The development or shared-use of GIS databases could be useful in meeting this policy recommendation. In addition, the Corps could be responsive to action 2 by posting and making greater use of Internet data. Obstacles which may prevent or hinder the use of shared data between agencies such as proprietary restrictions, funding limitations, incompatible formats and data quality and scale, will need to be addressed before launching into joint efforts. See also PRs 3.1 and 3.5.

PR 5.8: Biodiversity Protection. *Create voluntary partnerships among private landowners at the local and regional levels to foster environmentally responsible management and protection of biological diversity, with government agencies providing incentives, support and information.*

Action points: Agencies should promote the role of private landowners in habitat and biodiversity protection and should create partnerships with nonprofit organizations to establish land trusts and other protected areas (action 6).

Response: The Council asserts that individual efforts alone are unlikely to be sufficient to protect broad-scale elements of biological and ecological diversity. Given this, agencies should explore opportunities to foster partnerships aimed at identifying, restoring and protecting areas of high or imperiled levels of biodiversity, possibly through MOU's, MOA's and partnerships. Opportunities may exist for the Corps to contribute to the conservation of biodiversity through ecosystem restoration and regulatory efforts, through stewardship efforts on Corps-managed lands, and through water control management. The Nature Conservancy's database on biodiversity resources to identify high value or risk areas may be useful in identifying significant needs and opportunities for biodiversity protection.

PR 7.1: International Leadership. *Promote economic and national security by actively participating in and leading cooperative international efforts to encourage democracy, support scientific research, and enhance economic development that preserves the environment and protects human health.*

Action points: The federal government, assisted by nongovernmental organizations and private industry, should maintain scientific research and data collection related to global environmental challenges. Credible, complete, and peer-reviewed research and data are central to guiding U.S. policy and international deliberations.

Response: - The Corps participates in a number of international initiatives through which it is incorporating or has the potential to help foster the goals and principles of sustainable development. Some examples of international initiatives of which the Corps is a part include the Great Lakes Water Quality and Ecosystem Charter, the Great Lakes Water Level Management Initiative, Devils Lake, the Red River of the North, and other efforts working with the International Joint Commission and Environment Canada. In each of these efforts the Corps helps to develop a shared vision of the desired future, along with workable and practical basin-wide strategies and projects that will address real issue that affect the communities and governments involved. In these and other efforts, the Corps is assisting in basin management planning with sustainable development as a goal. The Corps can provide scientific and other types of technical assistance, as well as work to address the complex issues associated with economic development, environmental health and social well-being and equity that are inherent to each particular initiative. Such assistance may also be provided to the Ivory Coast and the Nile Basin states in the future.

As part of the Civil Works Directorate, an Interagency and International Activities Office serves as the principal manager and coordinator for interagency and international activities. This office manages the Support for Others Program, through which the Corps assists governmental (non-DOD) and other entities by providing them quality engineering, environmental, construction management and related services. The office is also the liaison for interagency and international activities, serving as the HQUSACE focal point for providing Technical Assistance to U.S. businesses overseas.

The Assistant Secretary of the Army (Civil Works) and the Chief of Engineer are responsible for management of the U.S. Section of the Permanent International Association of Navigation Congresses (PIANC). PIANC is an international, intergovernmental, nonpolitical, and non-profit organization

supporting engineering excellence and leadership in inland and marine navigation waterways development and maintenance through technical studies. The Corps is a member of PIANC, serving on a number of its committees and chairing the Permanent Environmental Commission (PEC) adopted in 1994. The formation of the PEC was intended to send a clear signal of a leadership role in adopting an environmentally balanced approach to navigation infrastructure development and maintenance. The Declaration of its 1994 Congress on Navigation and the Environment summarizes PIANCs environmental mission, and states that PIANC *will fully support the principles of sustainable development and actively promote a holistic approach to managing environmental issues that manifest themselves in regard to waterways development, operations and management*. The PEC has several international working groups dealing with the technical aspects of dredged material management and disposal, as well as habitat and port activities. The PEC also has a task group to investigate the economic aspects of environmental investments. Because of the breadth of its membership, PIANC may be a source of ideas on the implementation of sustainable development principles, and how other countries and organizations address trade-offs among the three elements of sustainable development.

Table B-1. Examples of partnerships between the Corps and others.

- The **Coastal America Partnership** - an interagency program designed to address coastal marine resource problems and management issues, including coastal wetland issues; the Corps has participated with this partnership program through Section 1135 and Section 22 initiatives.

- The **Louisiana Coastal Wetlands Conservation and Restoration Program** - interagency and intergovernmental task force working to develop ways to prioritize and implement wetland restoration projects in coastal Louisiana; the Corps chairs the interagency task force and has had the lead in implementing 7 out of 35 projects.

- The **Gulf of Mexico Program** - an EPA managed program designed to coordinate programs and activities which impact the natural resources of the Gulf area; the Corps serves on a policy board as a technical advisor.

- The **Marine Fishery Habitat Restoration and Creation Program** - under a 1991 cooperative agreement, the Corps and the National Marine Fisheries Service work to create and restore fish habitat in conjunction with management of the Nation's water resources.

- The **North American Waterfowl Management Plan** - the Corps participates with the Department of Interior in improving and protecting waterfowl habitat.

- The **Upper Mississippi River System-Environmental Management Program** - an interagency initiative designed to protect and balance the resources of the Upper Mississippi River Basin and guide future river management. Ongoing efforts include: habitat rehabilitation and enhancement projects; long-term resource monitoring; and navigation traffic monitoring.

- **National Estuary Program** - identifies, restores, and protects estuaries along the coasts of the U.S., engaging local communities in maintaining the integrity of the whole system - its chemical, physical and biological properties, as well as its economic, recreational, and aesthetic values.

Appendix C
Equity Considerations in Sustainable Development

Introduction.

Equity, in common terms, is defined as the state or ideal of being fair, just, and impartial. As used in economics, "an allocation is equitable if no agent prefers any other agent's bundle of goods to his or her own" (Varian 1990; p. 533). In practice, equity, like morality, justice and ethics is described mostly in procedural terms. This approach reflects the basic principle of equal treatment before the law, i.e. similar cases must be dealt with in a similar manner. There is an elemental virtue in the uniform applications of rules, procedures, criteria and standards. Process is often used as a proxy for equity, for which we have not good metric. A uniform, procedural approach, however, does not guarantee uniformity of outcomes.

Another aspect of equity is that associated with the outcomes of decisions or consequences. In many socio-political systems, including that of the United States, there are various permutations of the definitions and view-points on consequentialist equity. These variations appear across all federal agencies, often within a single program or regulation and are briefly described below:

> Parity is a formula for equal distribution of burdens or benefits. Parity demands that all claimants receive equal shares; it is closely associated with egalitarianism. (e.g. safe drinking water, air quality, public transport).
>
> Proportionality is a principle that dates back to Aristotle, and asserts that burdens or benefits should be distributed in proportion to the contribution of the claimants. (e.g. allocation of highway gasoline taxes to state construction programs).
>
> Priority argues that those with the greatest need should be advantaged. This puts the emphasis on the absolute right of individuals to goods and services necessary to sustain their lives at some minimum standard of well-being (e.g. welfare programs).
>
> Classical utilitarianism proposes that burdens (costs) and benefits should be distributed to achieve the greatest good for the greatest number, or maximizing total utility (e.g. National Economic Development benefits).
>
> Rawlsian distributive justice (Rawls, 1971) took the concept of utilitarianism further by arguing for an equal distribution unless an unequal distribution operates to the benefit of the least advantaged (e.g. affirmative action set asides).

No society has ever had complete consensus on any one of these approaches alone as an adequate criterion for defining consequentialist equity. In practice, each of these approaches are practiced in nuanced and subtle ways. There is no complete consensus on which, if any of these approaches alone as an adequate criterion for defining consequentialist equity. In practice, each are practiced is subtle, combined ways.

The consideration of equity in policy analysis is important, in part, because efficient outcomes are blind to distributional outcomes. Maximizing efficiency generates the most highly valued output possible. An additional decision process, based on ethical and political considerations, is needed to determine who ends up with that output.

Equity, even by the narrow economic definition, does not mean that all individuals should get equal portions of the economic pie. Redistribution of wealth to improve equity is done by public institutions, usually governments, based on some kind of averaging of the individuals' views on what is fair and equitable. Some people believe that equity is achieved if opportunity is equal, regardless of the outcomes. Equality of opportunity is probably viewed widely as contributing to equity, but it is not the same thing. Equity ultimately depends on the values of the individuals in a society and their aggregate expression of what allocation of resources is fair.

Measuring equity is not easy. The President's Council notes, "measuring fairness and equality of opportunity throughout a population is complex. It requires measuring differences between rich and poor in a number of ways and involves yardsticks not yet available." (PCSD 1994; p. 16). One measurement issue is the range of goods included in the analysis. Equity can be measured in "financial" terms, that is for goods marketed in dollars, as compared to "economic" terms, which includes both financial goods and non-marketed assets to which a dollar value is not easily attached. "Income distribution" normally refers to the degree of financial equity, and that definition is be used in this discussion. "Economic equity" or "social equity" means the distribution of all valuable assets, whether traded in markets or not.

Social equity has not been a primary focus of the Corps' Civil Works program. Efficiency, as measured by net national economic development (NED) benefits, has been the explicit goal. This focus on efficiency, however, seems logical, as the ethical and political considerations needed for decisions on equity would not be expected to reside primarily in an engineering organization. Nevertheless, decisions in Civil Works programs do have equity ramifications. Equity effects of Corps activities receive attention from the Corps when they are identified. Usually this is done by describing the effects for decision makers' review but in some cases by incorporating equity issues into project design.[1]

Potential Approaches for Advancing Equity Goals.

This Appendix does not attempt to say what the Corps should do to advance equity. Rather, it indicates some of the approaches that could be used if the Corps were given the mission to incorporate this leg of the sustainable development table into its missions to a greater extent than has been the case. Four approaches have been identified:

- Examination of extending the NEPA process
- Using the Other Social Effects (OSE) account more explicitly
- Further development of public participation and shared vision processes
- Partnering with other agencies whose primary missions are to advance social well being and equity.

It is important to recognize that these <u>potential</u> approaches <u>can be used alone or in combination</u>. Applications of these approaches within the Corp's planning process will probably be the most common, but there may also be opportunities, again, if the Corps were tasked, to promote social equity in the operations and maintenance or regulatory programs. The appropriate choice of approaches will depend on the

[1]Some equity ramifications result from assumptions of benefit-cost analysis used in the Corps' procedures for economic evaluations. These assumptions are seldom made explicit. Stating them more clearly may lead to further progress in reporting and incorporating equity concerns.

traditional mission area (such as flood damage reduction or navigation) or the specific project being considered. Also important will be local and regional conditions and the types of effects required

to satisfy the equity objectives of interest at the time. The involvement of other federal agencies and their contributions to sustainable development may also be important in designing the Corps' approach. This Appendix discusses each of the four approaches identified.

Extending the NEPA Process

The "NEPA process" is the term applied to the project and program evaluation portions of the National Environmental Policy Act of 1969. The Act establishes a broad federal policy on environmental quality. An Environmental Impact Statement or Environmental Assessment is required to support decision making on all federal actions which affect the environment. Statements or assessments are required for Corps projects and major regulatory decisions. These assessments cover a variety of environmental and social impacts and effects.

NEPA originally focused on traits of the natural environment, but it has been extended to include social and cultural attributes. This expanded view of the environment makes the NEPA process a potential way to address social equity. There are two bases for using the NEPA process to promote social equity. First, NEPA assessments help to identify environmental constraints which are used in planning under the P&G. Second, the NEPA process has been identified by DOD as the implementation vehicle for Executive Order 12898 which addresses environmental justice. These bases are discussed below.

Social Equity within NEPA Environmental Constraints

Environmental constraints are important in Corps planning, as clearly stated in the P&G's requirement to assure a recommended plan is "consistent with protecting the Nation's environment" (Water Resources Council 1983; p. v). NEPA is an important tool in identifying these environmental constraints. As noted above, NEPA's view of the environment is expanded to included social effects. This makes NEPA one possible tool with which to address social equity.[2]

Historically, the Corps has reported on social effects of projects and tried to avoid social problems in project implementation. The approach has been analogous to the process for avoiding and mitigating environmental problems. NEPA has been useful in both environmental and social types of Corps efforts to date. However, the NEPA process is discussed here due to its potential for even greater effect if more attention is required to satisfy the social equity goal of sustainable development.

Social concerns actually appear in the NEPA process via inclusion of resources specifically mentioned in Section 122 of the River and Harbor and Flood Control Act of 1973[3] This Section directs

[2]What is meant by "addressing social equity" has no consensus definition. It does not necessarily require that an agency expend resources solely to redistribute income. It does require a degree of recognition and accounting for social impacts of agency actions and decisions. It is the degree which is both critical and a matter of judgement. In this discussion, "addressing" will refer to the Corps, if its mission is appropriately modified, accounting for social equity to a greater degree than in current practice.

[3] Section 122. Not later than July 1, 1972, the Secretary of the Army, acting through the Chief of Engineers, after consultation with appropriate Federal and State officials, shall submit to Congress, and not later than ninety days after

the Corps to address adverse economic, social, and environmental effects of proposed projects. Social equity, and any success or failure in approaching it, can be indicated by data describing these effects. Separate reports responding to the effects listed in Section 122 were initially prepared, but the information is now included in NEPA documents.

Environmental Justice Directives

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was signed by President Clinton on February 11, 1994 (Executive Order 12898, 1994). While environmental justice and social equity deal with many of the same issues, they are not the same. Environmental justice could be considered a subset of social equity. Environmental injustice stems from disproportionate adverse effects of environmental activities, while social inequity can result from more general economic and social effects. The degree of overlap between the two is an empirical question, beyond the scope of this report. If the overlap is large, then the two concepts are not easily distinguished.

Procedures developed by the Federal government provide a vehicle to investigate and address environmental justice, and may be useful in at least some aspects of advancing equity and sustainable development. As many environmental justice initiatives are new, an additional reason for including them here is to make information about recent developments available to Corps personnel.

Executive Order 12898 makes environmental justice part of the missions of federal agencies. They are to identify and address disproportionately high and adverse human health or environmental effects of their activities on minority and low-income populations.[4] The order has three goals:

- to focus federal attention on the environmental and human health conditions in minority and low-income communities
- to promote non-discrimination in federal programs which substantially affect human health and the environment
- to provide minority and low-income communities greater access to information and opportunities for involvement in relevant matters.

submission, promulgate guidelines to assure that possible adverse economic, social and environmental effects relating to any proposed project have been fully considered in developing such project, and that the final decisions on the project are made in the best over all public interest, taking into consideration the need for flood control, navigation and associated purposes, and the cost of eliminating or minimizing such adverse effects and the following:

(1) air, noise and water pollution;

(2) destruction or disruption of man-made and natural resources, aesthetic values, community cohesion and the availability of public facilities and services;

(3) adverse employment effects and tax and property value losses;

(4) injurious displacement of people, businesses and farms; and

(5) disruption of desirable community and regional growth.

Such guidelines shall apply to all project authorized in this Act and proposed projects after the issuance of such guidelines

[4]The Order effectively defines environmental justice as the absence of these effects on these populations.

Goldman (1993) describes the environmental justice movement as having emerged from thousands of community based organizations active in seeking social justice[5]. He writes "[e]nvironmental justice is concerned with the distribution of environmental benefits and harms. It asks whether the procedures and impacts of decision making are fair to the people they affect" (p. 1), by this definition, there seems to be a great deal of overlap between environmental justice and social equity. Goldman's paper provides a context for the environmental justice discussion, as it summarizes 64 empirical studies of environmental disparities by income and race. He considers this group of studies to be comprehensive and representative, although not exhaustive.

Taken together, the 64 studies reviewed here provide an overwhelming body of empirical evidence that people of color and lower incomes face disproportionate environmental impacts in the United States. All but one of the 64 studies (98%) found environmental disparities.... Racial disparities were found more frequently than income disparities (in 87% of the tests of racial disparity compared with 74% of the tests in income disparity). (p. 8)

He notes that "distributional concerns are overshadowed by concerns for economic efficiency, that is, net gains in public welfare for the country as a whole." (p. 18)

Executive Order 12898 created a cabinet level Interagency Working Group (IWG) to provide guidance, coordination, and other assistance in implementing the Order. EPA heads the IWG, and DOD is a member. The IWG prepared a report to the President, dated April 11, 1995, which describes the implementation of the Order and included environmental justice strategies. The strategies focused primarily on matters of process, such as increasing outreach and revising internal management to incorporate environmental justice. The report noted the activities of the DOD Committee on Environmental Justice and highlighted DOD demonstration projects which provide Native Americans access to traditional cultural properties located on DOD facilities.

Following the Executive Order and the IWG direction, the DOD Committee on Environmental Justice prepared a "Department of Defense Strategy on Environmental Justice," dated March 24, 1995. It includes an implementation plan focusing on institutional changes to ensure a healthy and safe environment for DOD activities conducted in the vicinity of minority or low-income populations. The Strategy was prepared by the Office of the Deputy Undersecretary of Defense (Environmental Security).

The Office of the Assistant Secretary of the Army, Installations, Logistics and Environment (IL&E) requested that the Army Environmental Policy Institute (AEPI) assist in developing Army policy to implement the Executive Order. AEPI has prepared a draft guidance memorandum which reiterates the policies set forth in EO 12989. The guidance directs the Army Chief of Staff or designee to provide direction to Army commands for carrying out environmental justice policies and responsibilities for fulling the Order. The Assistant Secretary of the Army (I,L&E) or designee shall:

- advise on policy for compliance with the Executive Order
- serve as principle point of contact for the Army in implementation matters
- participate in relevant DOD working groups

[5] Many of these organizations represent people of color, rural residents, and working class individuals and are often led by women. This is in contrast to the national environmenal organizations which are largely white, suburban, middle class, and run by men.

- ensure Army input to DOD for revisions to their Strategy
- maintain liaison with the Chief of Public Affairs.

The Army Chief of Staff or designee shall:

- coordinate with agencies participating in the IWG
- ensure all appropriate instructions, orders, and regulations implement Army environmental justice policy
- plan, program, and budget resources to implement the Order
- provide training regarding the Order
- coordinate with the Assistant Secretary of the Army (I,L&E) about the DOD Strategy
- implement Army environmental justice policy and applicable parts of DOD Strategy
- provide representatives for IWG working groups.

The NEPA process has been identified by DOD as the implementation vehicle for Executive Order 12898. Draft revisions to Corps of Engineers regulation ER 200-2-2, "Procedures for Implementing the National Environmental Policy Act," include the consideration of environmental justice. Thus, if the Corps decided to pursue social equity goals, at least to some degree, through the environmental justice approach, there is already a framework available in which to organize the needed actions.

Other Social Effects Accounting

Other Social Effects (OSE) is one of the four accounts established in the P&G. It "registers plan effects from perspectives that are relevant to the planning process, but are not reflected in the other three accounts."[6] (Water Resources Council 1983; p. v) The OSE account evolved from the Social Well-Being (SWB) account in the P&S (Water Resources Council 1973).

Using the OSE account to embody social equity issues is a significantly different approach, in theory, than using the NEPA process. The former provides an opportunity to bring social effects into the production function, that is, the mix of inputs required to meet project objectives. This could potentially make equity a basis or the basis for some of the alternative plans to be considered. The NEPA requirements, even though addressed at the feasibility stage of planning for federal actions (40 CFR 1502.5), are generally viewed as constraints rather than identification of opportunities.[7] Under NEPA, adverse environmental and social impacts are avoided, if possible, or mitigated, to the extent possible.

In practice, however, the OSE account has not been effective in bringing social effects such as equity into the Civil Works planning process. Since the promulgation of the P&G in 1983, there have been no Corps studies in the Civil Works program which have explicitly employed the OSE account. This does not

[6]The other accounts being national economic development (NED), environmental quality (EQ), and regional economic development (RED). RED may also be an indicator of equity, for example in quantifying regional employment and related income effects. The distinction between RED and OSE is difficult to establish clearly, especially at a detailed accounting level.

[7]An analogy to pollution control may be helpful. The NEPA process is analogous to an end-of-pipe control measure; considering ultimate impacts is like accepting a given polluting process. The OSE approach is akin to process modification for pollution control; the raw materials and technology used (the production function) can be modified to optimize process and environmental outputs.

mean that information on social effects has not been presented or used. It suggests that any information relevant to social equity has not been organized as a specific account. OSE effects have been considered, but only as ad hoc adjustments to the NED account.

Nevertheless, the OSE account is one possible way to get the social equity aspects of sustainable development into Civil Works decisions. It may be the best way, at least theoretically, to allow social circumstances to assist in finding opportunities to plan for multiple objectives. There is little current experience in using OSE, but it may provide a way to explicitly bring these issues into the decisions trading off costs and benefits of projects. It is recognized that just reporting social effects in the format of an OSE account won't necessarily affect plan formulation. Lack of attention to the P&S SWB account is given as one reason for the OSE account not being used. Management attention, which in the Corps comes from mission assignment, is needed for OSE or any other factor to become important enough to affect outcomes. This reiterates the point that use of OSE account is not recommended for its own value but only if the Corps is tasked with the mission of further addressing social equity as a component of sustainable development.

In the planning process, the OSE account might help define an alternative plan which provides for social equity as well as efficiency. If this alternative were not the NED plan, the P&G requires the Secretary of the department to grant an exception for selection of this plan. In that case, any direction given to the Corps to include social equity in its mission would be a basis for claiming overriding reasons not to select an NED plan, which is the basis for the exception.[8]

Public Participation

Another way in which to incorporate social equity is to assure that all racial and income groups are equally able to participate in and affect Civil Works decision making processes. As Goldman (1993) states, "political power rather than scientific assessment usually determines the distributional outcomes of public policy decisions." (p. 18) The Corps expends considerable effort to involve the public in the planning process. However, the unequal distribution of power within the country as a whole cannot but be reflected in the Corps process. Further effort and innovation in public participation will be needed if this approach is to be used by the Corps to address the equity issues of sustainable development.

Two policy recommendations in the PCSD report are particularly relevant to the use of public participation to further social equity and can relate to the Civil Works Program. The first is **PR 3.3, Improved Access to Information**. This recommendation calls for adopting open information policies and practices and for adopting policies which increase access to public information for all segments of society. Information in electronic media and computer access are seen as central to improved availability of information, provided the access is broadly distributed. The Civil Works program is making greater use of the Internet to get information to the public, for example in the environmental restoration study in the Everglades of Florida. However, even though such networks greatly increase the ability of the Corps to communicate with the public, it is not safe to assume that they provide the full access required to completely address social equity concerns. Computers are expensive and are not as available in low-income communities as in more affluent ones. Additional outreach by the Corps may be needed if it decides to use public participation to further social equity.

[8]The need for Secretarial exceptions could be eliminated if the OSE account were made one of the ones to be maximized under the P&G. Such a change in the P&G certainly would bring addressing social equity into the Corps' mission to a greater extent than it is now. However, changing the status of the OSE account is not expected, so its implications are pointed out only as an interesting hypothetical extension.

The second recommendation is **PR 3.4, Information for Sustainable Living**. *Endorse and promote awareness of the economic, environmental, and social benefits of sustainable practices -- such as more efficient resource use in government...-- and encourage local governments, businesses, and community groups to engage people in making these improvements.* Social equity is integral to sustainable practices, and a greater understanding of its benefits would provide an incentive to move toward sustainable development. One application to the Corps might include making the assumptions of benefit-cost analysis more widely known and understood.

An approach to planning and problem solving developed in the Drought Preparedness Study (U.S. Corps of Engineers 1995), a part of the National Drought Study, may be useful in improving public participation and advancing social equity and sustainable development. This approach is called the Shared Vision Process (SVP).[9] The SVP addresses two common shortcomings of traditional water management: the separation of stakeholders from the problem solving process and the fragmentation of natural resources management by jurisdiction and agency. The SVP addresses these by:

- using collaboratively built shared vision computer models to assist people in negotiating water decisions
- involving stakeholders, balancing benefits of broad participation with management of large groups
- attempting to reduce impacts, not just allocate water shortages
- integrating drought response with overall water management
- helping regional managers benefit from national expertise and experience
- assembling planning teams from existing organizations without creating new bureaucracies.

With its multi-objective framework, sensible public involvement techniques, and shared vision computer models, the SVP method is designed to address the three main goals of sustainable development better than some other planning approaches. But SVP is not immune from the limitations of planning in general. SVP is unlikely to induce collaboration towards mutual goals if there are stakeholders who feel they would inevitably lose their dominant position by collaboration. SVP could be intimidating to the economically and educationally disadvantaged Moreover, the success of SVP is at least as dependent as other planning approaches on the skills and commitment of the planning team.

Partnerships with Other Agencies

The Corps could address social equity by working with other agencies whose primary mission includes wealth distribution issues. The partnerships envisioned would have the Corps pursuing efficiency maximizing water resources projects and activities, personnel from both or all agencies identifying and measuring any adverse welfare distribution effects, and the other agency(ies) taking steps to adjust the welfare of individuals according to societal goals. At the national level, the Departments of Health and Human Services and of Housing may be appropriate partners. State, tribal, and local agencies could also be partners. These agencies may be able to alter equity more effectively by taking advantage of economies of scale within their agencies.

[9] The is approach has since evolved to be called the Shared Vision Approach (SVA), see chapter 4.

A partnering approach would be consistent with **PR 2.7 of the PCSD** report. It says to "[c]reate intergovernmental partnerships to pursue economic prosperity, environmental protection, and social equity in an integrated way." (PCSD 1996; p. 53) The DOD Strategy on Environmental Justice also concludes that a key action will be to "[c]ooperate and work with other Federal agencies in the government-wide implementation of Executive Order [12898], to ensure efficient use of information data systems and to avoid duplication and waste of Federal resources." (DOD 1995; p. 20)

The partnering approach to achieving social equity could have an additional advantage. It would allow the Corps to focus on efficiency, as water resources are probably poor tools for social redistribution. Gardner (1981) says that water policy has often been used to redistribute income, regardless of efficiency considerations. He recommends that water resources managers attend to efficiency and stop using water policy to distribute income.

Synthesis of Equity Issues in Sustainable Development

Two questions tie together this discussion of social equity in the Civil Works program. First, what evidence is there of income disparity in the distribution of benefits from Corps projects? Second, what conceptual frameworks exist to compare or combine the approaches to equity issues discussed above?

First, very little work has been done to measure the distribution of benefits of Civil Works projects. Corps projects may be progressive, neutral, or regressive in their distribution of benefits and thus their contribution to social equity. To the extent they may be regressive, sustainable development dictates that social inequity, if any, be addressed.

The main study of equity in Civil Works is a review prepared in response to Section 719 of WRDA 86 (Hansen and Bright 1989). They found, using a 10% confidence interval, no systematic bias against low-income areas, although they found a bias against rural areas. They also concluded that projects providing primarily navigation or flood damage prevention tend to be located more frequently in urban and higher income areas than projects supporting other missions.[10] Further research seems to be warranted into the distribution of outputs of Corps projects to indicate whether and to what extent social equity issues are raised by Civil Works projects and which of the above approaches, if needed, might be expected to best support sustainable development.

The second question, regarding a conceptual framework, is also without an easy answer. However, one potential answer comes from the international negotiations over sustainable development. Capacity building, the strengthening of social institutions, is a frequent theme in United Nations statements. For example, the Brussels Workshop, in 1992, on building capacities noted "[m]ost problems of [water resources] sector performance have their origins in institutional and managerial shortcomings." (United Nations Development Programme 1994; p. 46). Also, the Global Consultation convened in New Delhi, in 1990,

[10] The use of a 10% confidence interval, while a frequently used span, seems arbitrary in this study. For example, in the data for all studies and projects, (Hansen and Bright 1989; p. 27) the mean value of dwelling units reported favorably was $47,434 (standard deviation $6215), compared with $42,919 (standard deviation $5213) for unfavorable reports. With a difference of almost a standard deviation, a statistical difference would be found if a larger confidence interval were accepted. The difference between mean household incomes is approximately 0.6 standard deviation. Again, this could be taken as evidence of income disparity in the outputs of Corps projects. This footnote discussion points out that other conclusions can be drawn from the report data, and it highlights the difficulty of measuring income disparity and interpreting these measures for the types of projects the Corps does.

stated, "Strong institutions are essential for sustainable development." (United Nations Development Programme 1994; p. 23). The importance of the capacity of institutions is also reflected in the sustainable development literature within the United States. For example, the Western Governors Association and the Western States Water Council found "in most cases, developing and implementing technical solutions is less of a problem than overcoming the reluctance of affected parties to negotiate in good faith" (ACIR undated; p. 10). Also, the focus of the 1995 annual conference of the Association of State Floodplain Managers was "Developing Local Capabilities" (1995). If the Corps is required to increase its attention to social equity to satisfy sustainable development, the extensive literature on capacity building may provide guidance and a framework for an integrated approach.

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13. ABSTRACT (Maximum 200 words)

The President's Council on Sustainable Development (PCSD) released its report, "Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future", in February 1996. Sustainable development is defined as that which *meets the needs of the present without compromising the ability of future generations to meet their own needs.* The Council's report highlights economic prosperity, environmental health and social well-being and equity, as equally important goal areas which cannot be addressed in isolation. The PCSD emphasizes the pursuit of public policies which integrate these goal areas, and the application of systematic consideration of the consequences of current actions on future generations. An IWR policy study examined the concepts of sustainable development in relation to the Corps' Civil Works program. This report provides background on the concept of sustainable development and summarizes the goals and recommendations identified in the PCSD report. The PCSD recommendations relevant to the Civil Works program and activities are examined, and examples of Civil Works contributions to sustainable development are presented, along with alternative ways in which the Corps could consider or incorporate the concept into the Civil Works program. The report is intended to generate thinking and discussion about sustainable development in relation to Civil Works programs and activities.

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